

Appendix D

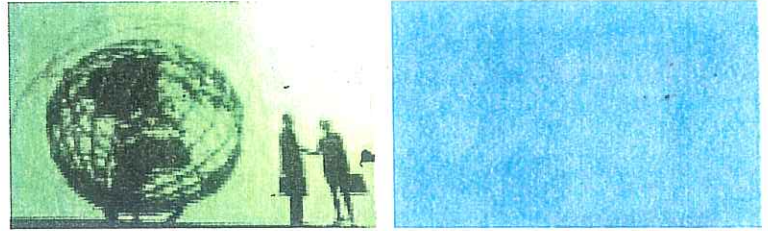
Endorsement Letters

Appendix E

Qualifications of Personnel Involved in the Preparation of the EIA

Eduardo del Río Pérez

Partner in Charge Environmental Services



Mr. del Rio has over seventeen years of experience. From 1988 to 1991 Staff Engineer, from 1991 to 1993 Chief of the Planning Division, Air Quality Area. From 1993 to 1999 Chief of the Permits and Engineering Division, Air Quality Area. As an Environmental Engineer on the Environmental Quality Board, Air Quality Section, responsible for enforcing compliance with federal and state air pollution regulations, reviewing and writing permits for air emission sources, and providing permitting and compliance assistance to other US EPA and state program office such as Superfund, RCRA in Solid Wastes. Developed the first Puerto Rico Title V operations permit and was in charge of the group that developed the program.

At EQB evaluated several EIS and EA such as Cogentrix, AES Co. and several pharmaceuticals expansions. At ERM-Puerto Rico he has worked on numerous EAs.

Developed the Paseo San Antonio EIS as part of the Golden Triangle for the Company of Economic Development.

At ERM he is the Partner in Charge of the Environmental Services Department which include Environmental Compliance, Permitting, and Air Services.

Fields of Competence

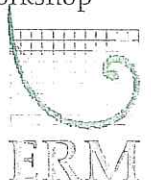
- Air Quality Issues Management
- Clean Air Act Amendments
- Title V Operating Permits
- Alternative Emissions Compliance Program
- Local and Federal Regulation Compliance NSR, PSD,
- NSPS, NESHAPs and permitting
- Pharmaceutical MACT Standards
- Risk Management Plan (RMP)
- Air Compliance Audits
- Air Emissions Calculations

Education

- B.S. Industrial Engineering, University of Puerto Rico (1988)

Technical Courses

- B.S. Industrial Engineering, University of Puerto Rico (1988)
- OSHA 40 hours Hazardous Waste Operations Health & Safety
- EPA Risk Management Program
- Personnel Protection & Safety
- Opacity Readings- Certified Opacity Instructor
- Odor Perception
- Combustion Evaluation
- Sources and Control of Volatile Organic Pollutants
- Clean Air Act Title III Implementation Workshop
- Risk Management Plans
- Visible Emission Evaluation Instructors Workshop
- Asbestos NESHAP Inspection Workshop



Key Projects

- Member of the team that evaluated in the Environmental Quality Board the EIS for the AES 450 plant in Guayama. AES, a coal fired co-generation project, prepared and submitted the PSD application to EPA and a Location Approval to EQB. A potential emissions inventory for the emissions sources was developed using approved emissions factors and other engineering calculations. An analysis to find the Best Available Control Technology (BACT) for certain pollutants.
- EIS and Location Application of the Abbott Co-Generator.
- EIS and Non-PSD Permit of the Puerto Rico Electric Power Authority for Puerto Nuevo.
- EIS for a proposed coal plant, Cogentrix.
- Developed the Evaluation Procedures for the Title V Applications and the first PR Title V Permit that the PR-EQB currently uses as model.
- Has worked in the development of the 94 PRASA RMPs, PSMs and PHAs.
- Analyzed the Title V and PSD implications of a fuel switch from fuel oil #6 to natural gas at PREPA Costa Sur.
- Analyzed the Title V and PSD implications of a fuel switch from coal to treated used lube oil a Portland Cement Kiln.
- Emissions calculations for Abbott, Searle, Procter & Gamble, Wesley Jessen, EcoEléctrica, Medtronic, Lederle, Essroc, Playtex, Merck, Bristol, etc.
- Worked in the Title V permitting for Phillips, AES, Abbott, Searle, Essroc, Shell Yabucoa and EcoEléctrica.
- EIS (Environmental Impact Statement) for Paseo San Antonio as part of the Golden Triangle Project.

Presentation

- Fundamentals of PR Environmental Law, Government Institute
- Environmental Air Regulatory Update Management Plans, Maximum Achievable Control Technologies (MACT) & Title V Permits, Panzardi-ERM
- PR's Title V Operating Permit Program, PRMA
- Clean Air Compliance in PR Course, Government Institute
- Hot Air Topics at the Colegio de Ingenieros
- White Paper 3 and Title V Flexibility for the Government Institute

Languages

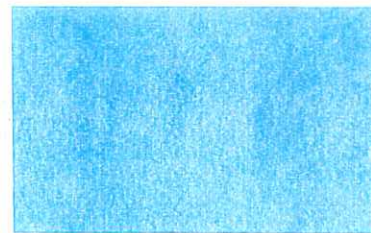
- Spanish/English

Affiliations

- Member of the Environmental Committee of the Puerto Rico Manufacturers Association

Damaris Negrón, BsCHE

Senior Project Manager



Twelve years of experience in the environmental field. Participated in the development of a broad range of multi-disciplinary environmental documents. Conducted environmental studies for industry, government and private groups. Worked as Environmental Facilitator for five years at two pharmaceutical companies, including one biotechnological facility.

Key Projects

- Environmental Manager at two pharmaceutical companies, responsible for supporting the construction and transference of a new product in an investment project of approximately \$4 million. Responsible for the operation of an industrial pretreatment wastewater system for which obtained an award from the Puerto Rico Aqueduct and Sewer Authority. Placed both organizations in the highest ranking of compliance with state and federal environmental regulations and with the Corporation's worldwide environmental practices, obtaining numerous government awards and the Corporation's Environmental Excellence Award. Led the process and achieved the certification for both facilities in ISO 14001 Environmental Management Systems and in EPA's Environmental Performance Tracking System. Obtained zero observations in the ISO 14001 Environmental Management Systems annual surveillance after certification.
- Has conducted Environmental Compliance Audits for over 20 Industrial Sites including pharmaceuticals.
- Coordinated and participated Environmental Impact Statements for diverse projects including the construction of Puerto Rico Olympic Coliseum, Playa Santa Resort, and the marine front of two municipalities in Puerto Rico. Supported the development of the EIS for a coal-fired energy cogeneration plant.
- Prepared and gave support in the preparation of the Solid Waste Management Authority's Reduction, Reuse and Recycling Plan of Puerto Rico. In addition, worked in the development of numerous pharmaceutical companies' solid waste characterization study and recycling programs.

Fields of Competence

- Environmental Compliance Audit & Trainings
- ISO 14000 GAP Analysis & Implementation Facilitator
- Phase I, Phase II Environmental Site Assessments
- Phase III Environmental Site Assessments -Remedial Actions
- Sampling Activities, Strategy and Plans Development
- Documentation for Compliance with Federal and State Regulations on Water Pollution Control (Storm Water, SPCC, UIC)
- Environmental Impact Statements
- Asbestos and Lead Surveys
- Support in Clean Air Act Compliance
- RCRA Compliance
- Tier 1 and Tier 2 EPCRA Reports
- SARA 313 Compliance
- Six Sigma Process Excellence Projects
- Knowledgeable of Occupational Health and Safety Policies

Credentials

- BS Chemical Engineering, University of Puerto Rico, 1994
- Industrial Waste Control, University of Puerto Rico, 1994
- Environmental Chemistry, University of Puerto Rico, 1994
- 40-Hour Course in Resource Conservation and Recovery Act
- 40-hour Hazardous Waste Operations Health & Safety Course
- U.S. Regulatory, RCRA and DOT Training and Seminars
- 8-hour Hazardous Waste Operations Health & Safety Course
- Confined Space Entry Supervisor Course
- DOT General Awareness and Function Specific Training
- Project Management Training
- International Environmental Assessment Training
- Storm Water Multi-sector General Permit Seminar
- Environmental Documentation and Construction Permit
- M&A Audits Course
- ISO 14000 Environmental Management Systems Lead Assessor
- OHSAS 18001 Occupational Health and Safety Management Systems Trained
- Six-Sigma Green Belt

Languages

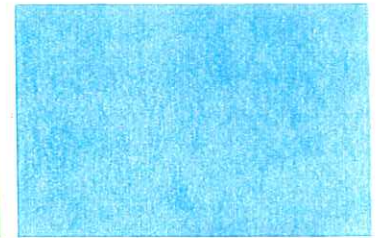
Spanish and English

Key Projects (cont.)

- Have conducted over 60 Phase I and Phase II site assessments in different properties, including pharmaceutical industries, throughout Puerto Rico and US Virgin Islands.
- Participated as coordinator in the implementation of a remedial plan and field work (Phase III) of a PCB contaminated site.
- Inspected and developed Storm Water Pollution Prevention and Erosion and Sedimentation Control Plan for several manufacturing facilities in Puerto Rico.
- Actively worked and coordinated implementation of action plans in several pharmaceuticals industries in Puerto Rico to obtain ISO 14001 Certification and lead the EMS implementation Program for Johnson & Johnson. All companies were certified.
- Accountable for coordinating activities related to the closure of all environmental aspects of a Department of Defense (Navy) facility in Puerto Rico. Knowledgeable of Navy's environmental practices and policies.
- Participated in the development of the Environmental Baseline Study for Roosevelt Roads Naval Base in Ceiba, Puerto Rico. This facility includes approximately 8,000 acres.

David W. Blaha, AICP

Environmental Impact Assessment Specialist



Mr. David Blaha has 24 years of experience in environmental assessment, natural and cultural resource management, and land planning for local, state, regional, and federal governments in the United States and internationally. He is thoroughly familiar with the regulatory/ procedural requirement of NEPA and has extensive experience with Section 7 of the Endangered Species Act, Section 106 of the National Historic Preservation Act, and Executive Orders for wetlands, floodplains, and environmental justice. Special expertise in evaluating energy, military, water resource, transportation, and land use projects.

Registration

- American Institute of Certified Planners, 1986

Fields of Competence

- Environmental Impact assessment for a wide variety of projects including military operations, airports, reservoirs, marinas, hydroelectric power projects, LNG import terminals, gas pipelines, highways, transit, housing, parks, and industrial development.
- Water resources, including water supply planning and water quality management. Analyses of sources, quantities, types, transport, and fate of pollutants. Skilled in the development of watershed and wellhead protection plans for surface and groundwater supplies and comprehensive river basin studies.
- Land planning including growth management, urban design, comprehensive planning, demographic projections, and transportation planning.
- Wetland ecology, including wetland delineation, functional assessments, mitigation design, permitting, and protection planning.

Credentials

- Master of Environmental Management, Duke University, 1981
- B.A., Biology, Gettysburg College, 1978

Professional Affiliations

- American Institute of Certified Planners
- American Planning Association
- American Water Resources Association
- National Association of Environmental Professionals

Languages

- Some familiarity with Spanish

Key Industry Sectors

- Mining and extractive
- Utilities
- Oil and gas
- Transportation
- International Development

Key Projects

Crown Landing Liquefied Natural Gas Project, New Jersey – Project Manager for a 1.4 BCFD LNG import terminal for BP consisting of a marine terminal and an on-shore regasification facility. Responsible for preparing the Environmental Report portion of the application for filing with the Federal Energy Regulatory Commission under Section 3 of the Natural Gas Act.

East Iceland Sustainability Initiative, Iceland – Project Director for the development of the overall sustainability framework and specific indicators and metrics for tracking the sustainability of a proposed aluminum smelter and hydroelectric project in rural East Iceland for Alcoa and Landsvirkjun. Extensive interaction with a wide range of stakeholders and international NGOs.

Sea Launch EA - Pacific Ocean – Coordinated preparation of an EA evaluating the environmental effects of launching several satellites from a ship-based launch platform in eastern equatorial Pacific Ocean pursuant to E.O.12114 (Environmental Effects Abroad of Major Federal Actions). Key issues were potential impacts to threatened and endangered species and marine mammals near the Galapagos Islands from potential mission failures.

Special Consultant to Chile – Invited by the U.S. Embassy in Chile to assist the Chilean government in implementing new national environmental impact assessment regulations. Reviewed the NEPA process in the United States with CONOMA (Chilean counterpart

of EPA), business leaders, academics, and environmental interest groups.

Xacbal Hydroelectric Project, Guatemala – Project Director for environmental and social due diligence review of a 94 MW hydropower and 125 km transmission line project on the Xacbal River in northern Guatemala for the Inter-American Investment Corporation (IIC). Key issues focused on ecological base flows, compensation for land acquisition, and community investment program.

St. Lawrence-FDR Hydroelectric Project (NY) EIS – Project Manager for third-party contract for preparing EIS for the New York Power Authority, FERC, and New York State. Coordinating innovative Cooperative Consultation Process (scoping) involving over 40 stakeholders for one of the largest hydroelectric projects in the eastern United States and the project that regulates water levels in Lake Ontario. Key issues include Native American concerns, fish and wetlands. Close coordination with International Joint Commission.

Watershed Management in El Salvador – Invited by the U.S. State Department as the principal speaker for an Earth Day conference on integrated watershed management and sustainable development in El Salvador. Participants in the conference included federal ministry representatives, NGO leaders, university professors, and the media.

Golden Pass Liquefied Natural Gas Project, Texas – Technical coordinator for evaluating the land use, recreation, aesthetic, and socioeconomic effects of a proposed LNG terminal for ExxonMobil.

Liquefied Natural Gas Project – Project Manager for a 4 MMTA LNG Import Project for a confidential client consisting of a marine terminal and an on-shore regasification facility. Responsible for preparing the Environmental Report for FERC under Section 3 of the Natural Gas Act, Project Health and Safety Plan, Phase II due diligence investigation, and federal and state permitting.

Key Projects (Con't)

Liquefied Natural Gas Project – Project Manager for a feasibility study for an LNG facility in the southeast. Investigated permitting issues, potential sources of heat for regasification, dredging issues, and endangered species.

FERC Environmental Support Contract – Deputy Program Manager for \$6.2 million contract for providing NEPA, engineering and economic support to the Federal Energy Regulatory Commission (FERC). Supervised the development of seven EISs and 12 EAs for the licensing of hydroelectric projects throughout the United States. Responsibilities included scoping/coordination with federal/state agencies, and consultation under the Endangered Species Act and the National Historic Preservation Act. Used IFIM, HEP, WET, and other techniques to assess project impacts.

Lake Gaston EIS, VA – Project manager for the development of an EIS evaluating alternative water supply sources for the City of Virginia Beach. Major issues include downstream effects on striped bass, shortnose sturgeon (an endangered species), water quality, and reduced waste assimilative capacity from the proposed diversion of 60 mgd from Lake Gaston. Completed one of the first assessments under the Executive Order for Environmental Justice, which was commended by EPA. Mobilized and coordinated a multidisciplinary staff of over 30 professionals from three offices in order to expedite high priority project. Complete DEIS on schedule in six months. The FEIS and ROD were appealed to the United States Supreme Court, which declined to hear the case, thereby upholding the agency decision.

U.S. Army Corps of Engineers, Baltimore District – Program Director for \$4 million multi-year environmental planning contract involving NEPA documentation, base master planning and environmental restoration studies.

Potomac Region Master Plan, Montgomery County, MD – Project Manager for developing a predictive model of the effects of impervious coverage, riparian buffers, forest cover, septic systems, stream geomorphology, and

other variables on aquatic health as measured using the Index of Biotic Integrity (IBI). The results of this analysis will be used in developing an environmentally sensitive master plan for three watersheds draining to the Potomac River.

Aberdeen Proving Ground Carrying Capacity Study, MD – Project Director for development of innovative GIS-based tool for evaluating cumulative effects of multiple projects on ecological carrying capacity of 72,000 acre installation on the Chesapeake Bay for U.S. Army Corps of Engineers.

York County Energy Partners Water Resources Study, Spring Grove, PA – Prepared a watershed study using HEC-3 to assess the potential effects of a 2.8 mgd consumptive water use associated with a 250 MW coal fired cogeneration facility as part of an EIV for DOE.

Rio del Oro Endangered Species Analysis, CA – Project Manager for an assessment of the regulatory requirements and development of a management plan for protecting the federally listed endangered fairy and tadpole shrimp, and associated vernal pool habitat encompassed by the proposed 3,800 acre mixed use Rio del Oro development project in Sacramento County.

Odenton Town Center, Anne Arundel County, MD – Coordinating NEPA 404 permit process for County with EPA, Corps, FWS, DNR, and MDE. Responsibilities include alternative analysis impact assessment, wetland functional assessment, quantification of indirect and cumulative impacts, conceptual mitigation design, and permit application preparation for two proposed arterial roads, and associated Town Center development.

Middle Cuyahoga River Flow Study, OH – Analyzed effects of 42 MGD water diversion by the City of Akron for water supply purposes on downstream water quality, assimilative capacity, aquatic community, recreation, and aesthetics. Calculated natural 7Q10 flow using flow data from a surrogate watershed. Testified as an expert at a trial in state court.

Key Projects (Con't)

Main Street Corridor, City of Buffalo, NY – Project director for urban design and traffic study for a redesign of a 1 ¼ miles of Main Street in downtown Buffalo, including design alternatives for a lightrail line, re-opening of a pedestrian plaza, and return of vehicular traffic. Large public involvement element includes design charettes and alternatives analysis. Prepared Environmental Assessment.

Fairfield Eco-Industrial Park Master Plan, Baltimore, MD – Project Manager for developing a brownfield redevelopment plan for an old, under-utilized 2,200 acre industrial waterfront area in Baltimore City for the Baltimore Development Corporation (BDC). Tasks included land assembly plans, infrastructure assessment, transportation plans, site plans for the reuse of larger tracts for up to 2.5 million square feet, actual design of a regional stormwater management facility, and drafting of an urban renewal ordinance addressing design guidelines and environmental performance covenants.

Clackamas River EIS, OR – Project Coordinator for third party EIS contract for the 187 MW Clackamas project for Portland General Electric using the FERC collaborative process option. Serving as facilitator for Land Use and Recreation Workgroups. Key issues are endangered salmonids and U.S. Forest Service 4 (e) authority.

Uwharrie Point Marina EA, Charlotte, NC – Project manager for EA evaluating a proposed marina adjacent to the Uwharrie National Forest. Major issues included evaluating the recreational carrying capacity of the reservoir and completing a Biological Assessment of potential impacts on the bald eagle, a federally listed endangered species for the U.S. Forest Service.

Sebago Lake EIS, Portland, ME – Project Manager for EIS evaluating alternative water level management regimes for the largest recreational lake in the State of Maine and the water supply source of 140,000 residents of the Portland metropolitan area. Key issues included effects on recreational boating, shoreline erosion, archaeological resources, water quality, wetlands, and aquatic weeds. Coordinated public meetings and presentations on this

controversial project. Instrumental in the development of a settlement agreement among the State of Maine, Portland Water District, and various recreational and environmental interest groups.

Felts Mills Hydroelectric Project EIS, Watertown, NY – Project manager for EIS evaluating original license application to FERC. Key issues involved potential effects on walleye, whitewater recreation, wetlands, and the need for the project. Also addressed cumulative impacts of multiple hydropower projects in the Black River Basin on fisheries and the intrinsic value of free-flowing river. Evaluated Department of Army's Section 4(e) recommendations.

Brookhaven National Laboratory (BNL) EIS, NY – Coauthored water resources section of EIS for the repowering of the high flux beam reactor at BNL for DOE. Key issues included tritium groundwater contamination and wastewater discharges.

U.S. Postal Service Carrier Annex Facility EA, WV – Project Manager for EA evaluating alternative sites for a proposed carrier annex facility in Morgantown, WV. Key issues focused on potential conflicts with Morgantown downtown redevelopment plan. Used Highway Capacity Manual to assess traffic impacts, AASHTO guidelines for intersection geometrics and vehicle turning movements, and FHWA's Manual on Uniform Traffic Control Devices for traffic signal warrants.

Housing-Related EAs, MD and NC – Project Manager for 15 EAs for the U.S. Department of Housing and Urban Development under their Community Development Block Grant and Housing Opportunity Programs. Key issues involved evaluation of noise and wetlands impacts.

Polyurethane Facility EA, MD – Responsible for QA/QC for EA evaluating a proposed polyurethane production facility at the David Taylor Research Center for the Naval Surface Warfare Center of the Department of the Navy.

Key Projects (Con't)

National Imagery and Mapping Agency (NIMA) EA, MD – Assessed traffic and parking impacts associated with closing the NIMA-Fairfax office and relocating these functions and 480 employees to Bethesda, MD. Evaluated adequacy of parking with standards of the National Capital Planning Commission and traffic impacts using the Highway Capacity Manual.

Churchman's Marsh EIS, Newark, DE – Coordinated with Federal and State agencies for the development of the Churchman's Marsh Reservoir EIS for a proposed 60 mgd drinking water reservoir impacting the largest tidal freshwater marsh in Delaware.

Queensbury, NY Remediation EA – Project manager for EA evaluating remediation alternatives for sediments contaminated with PCBs along the Hudson River, just upstream of the Town of Queensbury water supply intake. Key issue was resuspension of contaminated sediments.

Town of South Hill, VA Water Supply EA – Project Manager for EA evaluating impacts of a 7.0 mgd water withdrawal from Lake Gaston for a regional water supply project. Key issues included assessing the need for the project, alternative water supply sources, and effects on striped bass and hydrilla.

Wetland Restoration Plan EA, TN – Responsible for land use, cultural and historic resources and socioeconomic sections of EA evaluating wetland restoration options for Murfree Spring, Black Fox Spring/Lytle Creek, Hoover Lake, and Oaklands Spring in Murfreesboro, TN for the Nashville District Corps of Engineers pursuant to AR 200-2.

Maritimes and Northeast Natural Gas Pipeline, ME – Assessed wetlands and land use impacts of a proposed 227 mile long, 24 inch gas pipeline from Canada to Cumberland Center, ME for a potential competing application.

U.S. Postal Service Carrier Annex Facility EA, MD – Project Manager for EA evaluating alternative sites for a

proposed carrier annex facility in Rockville, MD. Key issues focused on potential conflicts with proposed Intercounty Connector Road, wetland protection, and forest conservation.

Radford Army Ammunition Plant EA, VA – Project Director for an EA evaluating the environmental effects of a proposed Modular Artillery Charge System – Load, Assemble, and Pack Facility at Radford pursuant to the Armament Retooling and Manufacturing Support Act of 1993. Key issues involved propellant waste management and socioeconomic issues.

Camp San Luis Obispo, CA EA – Project Director for an Army National Guard EA evaluating alternatives for mitigating sedimentation from the abandoned New London Mine on Chorro Creek, which provides critical habitat for the federally listed steelhead trout.

Cleveland-Hopkins Field International Airport EIS, OH – Evaluated EIS prepared by the FAA for the expansion of Cleveland Airport on behalf of several neighboring communities. Identified weaknesses in the Project Purpose and Need and Alternatives sections, as well as weaknesses in addressing cumulative impacts.

Air National Guard, Andrews Air Force Base, MD – Environmental Planning (NEPA) Program Manager for five-year contract with ANG providing NEPA, master planning, GIS, and wetland services nationwide. Supervised preparation of over 20 EAs addressing various airport construction projects, aircraft conversions, and training exercises. Projects were located in Washington, Oregon, Pennsylvania, West Virginia, Arizona, Mississippi, Maine, New Mexico, New Jersey, and Maryland.

F-16 Beddown at 162 Fighter Wing, AZ EA – Project Manager for EA evaluating environmental effects of the proposed beddown of 18, F-16 aircraft at 162 FW base at Tucson International Airport (TIA) for Air National Guard (ANG). Key issues involved noise impacts at TIA and effects of increased noise and use of inert and live munitions during training operations on the federally endangered Sonoran Pronghorn antelope at Barry M.

Key Projects (Con't)

Goldwater Range, including preparation of a Biological Assessment and Section 7 consultation with USFWS. ANG recommended that this EA become their new standard for other contractors.

Niagara Falls International Airport, NY EAs – Project Manager for two EAs evaluating the effects of constructing a new airline terminal and runway extension. Assessed effects on noise, historic structures, and vehicular traffic on behalf of the Buffalo-Niagara Frontier Transportation Authority for the FAA.

Smitty Airspace Modification, NM EA – Project Manager for evaluating the effects of creating the Smitty Military Operations Area to enable low-level military aircraft training exercises in New Mexico for the Air National Guard. Assessed effects of low-level sorties on the endangered Mexican spotted owl and on recreational use in two National Forests. The FAA was a cooperating agency.

Martin State Airport, MD, Expansion EA – Project Manager for evaluating the effects of several construction projects at the Martin State airport for the Air National Guard. Assessed effects on historic structures, wetlands, water quality, and noise.

Camp Murray EA, WA – Coordinated completion of an EA assessing the environmental impacts of nine various construction activities for the Air National Guard. Prepared Biological Assessment of potential impacts to Bald Eagles under Section 7 of the Endangered Species Act and obtained USFWS concurrence in less than one month in order to preserve construction funding.

Boeing Field Construction Activities EA, WA – Project Manager for an EA and FONSI evaluating four proposed construction activities at the Boeing Field Air National Guard Station, which is located adjacent to the King County International Airport. Assessed air quality conformity, liquefaction-prone soils and geology, and noise effects from the airport. Coordinated Coastal Zone Consistency Determination with Washington State Coastal Zone Management Program.

Bellingham Airport EA, WA – Project Manager for an EA and FONSI evaluating eight proposed construction and demolition activities at the Bellingham Air National Guard Station, which is located at the Bellingham Airport. Assessed air quality conformity, removal of asbestos-containing materials, and noise effects from the airport. Coordinated Coastal Zone Consistency Determination with Washington State Coastal Zone Management Program.

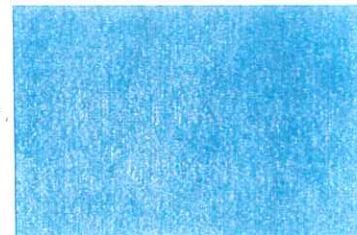
Pittsburgh International Airport, PA, Construction EA – Project Manager for EA evaluating effects of several construction projects for the 171st Air Refueling Wing at Pittsburgh International Airport. Addressed effects on air quality and safety.

Eagle Ace Communication Training Exercises, OR EA – Project Manager for EA evaluating the effects of air traffic control and military communication exercises at Redmond Municipal Airport. Evaluated effects on airspace management, safety, air quality and noise for the Air National Guard.

Publications

- LNG in the State's Energy and Environmental Future – Guest speaker at The Energy Council's Trends in Energy and the Environment Conference, Biloxi, MS, July 2003.
- The Effectiveness of Stormwater Management and Riparian Buffers in Mitigating the Effects of Urbanization on Streams – Paper presented at the Water Environment Federation Watershed 2002 Conference, Fort Lauderdale, FL, February 2002.
- The Relationship Between Imperviousness and Stream Quality in the Maryland Piedmont – Paper presented at the National Association of Environmental Professionals annual conference, Washington D.C., June 2001.
- Sustainable Development at the Local Government Level – Invited speaker at the American Consulting Engineers Council's Business Profiles in Sustainable Development Conference, Marco Island, FL, February 2001.

George Carlson, CWB



Mr. George Carlson is a Program Director within ERM's Planning practice, based in Portland, Oregon. Mr. Carlson has over 30 years experience in natural resources management and sustainable development. He specializes in assembling and managing strategic project teams to provide unique solutions to client problems and has worked extensively across the United States and overseas.

Mr. Carlson has strived to apply new concepts and technologies as they are introduced, such as adaptive management, GIS/spatial analyses, LiDAR, GPS, and ecosystem management, for example. Recent issues specific to the Pacific Northwest regarding protected salmonids, watersheds, and fish passage have required the development of such applications.

Professional Affiliations & Registrations

- Certified Wildlife Biologist (1999)
- Habitat Evaluation Procedures (HEP) US Fish & Wildlife Service (1987)
- The Wildlife Society: Chair, Steering Committee and Site Selection Committee for the 3rd International Wildlife Management Congress
- Former Chair, International Wildlife Management Working Group
- Member Wildlife Management Institute

Fields of Competence

- Program & Project Management, International and Domestic
- Wildlife Biology / Ecology
- Watershed Assessment
- Sustainable use applications
- Habitat modeling
- Integrated Spatial Technologies: GIS/GPS applications
- Petroleum Exploration & Development

Education

- M.S., Wildlife Biology, Colorado State University, 1989
- M.S., Coursework (ABT), Geology/Geophysics, East Carolina University, 1977
- B.A., Geology, University of South Florida, 1975

Publications (last page)

Key Projects

Program Manager, Los Angeles Department of Water & Power (LADWP) Environmental On-call Contract, OR/CA. Managed multiple task orders, and a Draft Environmental Impact Report under CEQA for projects associated with the yellow-billed cuckoo habitat enhancement plans for Baker & Hogback Creeks, in the vicinity of Big Pine and Lone Pine, CA. An aggressive schedule and potentially contentious project components make this a challenging project. LADWP contract administration and reporting requirements are complex and demand significant attention.

Program Manager, Program Management Contract, Yosemite National Park, CA. Directed a senior project management team for the National Park Service, an innovative approach that brought contract project managers into a "crown jewel" national park to manage the high profile components of a \$200 million capital improvement program. The program attracts national attention from the public and media. Members of Congress and the Senate also monitor the progress of the program on a regular basis. Projects were taken from schematic design through construction documents, with the completion of all required environmental and historical compliance. Great efforts were placed on sustainable design and working within the natural and cultural landscape.

Project Manager, 4 (d) Rule Programmatic Environmental Assessments, Portland, OR. Responsible for coordination between the National Marine Fisheries Service and project staff in the completion of three 4(d) rule programmatic environmental assessments affecting protected salmonids in Oregon, Washington, and California.

Forestry Applications for the New Generation of Remote Sensing Systems. Co-principal Investigator and Western Project Coordinator, Cooperative Research Program, USDA Forest Service, Southern Forest Inventory and Analysis Program, and the Forest and Wildlife Research Center, Mississippi State University. The project was a four-year study focused on the determination of tree and stand characteristics using new generation high-resolution aerial sensors. Project study areas included Mississippi, Idaho, and Washington.

President/Principal Ecologist, Resource Management Technologies.

Sustainable forestry project in northern Argentina consisting of forest mapping, management plans, and habitat assessments, for Trillium Corporation, Bellingham, WA. Integrated wildlife-habitat models for forest ecosystem management projects in the western U.S. for Boise Cascade Corporation, Boise, ID.

Developed wildlife species habitat models and resource management plans, completed protected species surveys, research and development of applications for new technologies in natural resource management, and the completion of due diligence analyses for large timber resource areas.

Program Manager, Houston Advanced Research Center (HARC). Managed development of a GIS database and spatial models for high profile litigation in Houston, Texas. Designed the national environmental database and oil spill model prototype for the country of Indonesia.

Senior Project Manager/Senior Scientist, Breedlove, Dennis & Associates. Coordinated all phases of large-scale wetland permitting and mitigation projects in Central, Southwest and South Florida, and South Carolina. This included technical overview and study/project design, protected species surveys, wildlife management plans, wetland mitigation plans, wildlife and regulatory agency coordination at the state and federal level (ACOE, EPA, USFWS, WMD, DEP), and public involvement during the planning phases.

Directed large-scale sustainable forestry/ecosystem management project and EIS preparation on 1 million acres on Tierra del Fuego, Chile.

Supervised a forest management GIS/GPS applications project in Argentina.

Designed and directed the construction of an environmental database and remote sensing vegetation and land use mapping project, including change detection analysis, for the City of Jacksonville, Florida Comprehensive Plan. Coordinated programs of study and expert witness preparation for the Everglades SWIM challenge.

Project Manager/Senior Geophysicist, Amoco Production Co., and Marathon International Petroleum. -Western U.S., Indonesia, Australia, and Alaska. Directed exploration programs inland and offshore, evaluated tender offers and shallow engineering data.

Amoco Production Company: Responsible for directing seismic field operations in the western U.S., preparing budgets, recommending drilling locations, interpreting and processing seismic data, preparation of technical reports, making technical presentations, and supervision and training of personnel.

Marathon International Petroleum: Assigned to the staff of the Vice President, Production International. Responsible for monitoring exploration activities in Indonesia and Australia, and designing special studies and projects in support of those offices.

Marathon Petroleum Indonesia, Ltd.: Responsible for directing an exploration program on offshore leases in the South China Sea. This entailed generating prospects, recommending wells, supervising 4-8 professionals, working with contractors on special data reprocessing, acquisition and site surveys, negotiating contracts, preparing budgets, designing regional studies, and working with Indonesian government agencies. Mr. Carlson was also involved in evaluating tender offers in Marathon's Singapore offices, and evaluating shallow engineering data for the location of offshore production facilities. Presentations were made to upper management and partner companies.

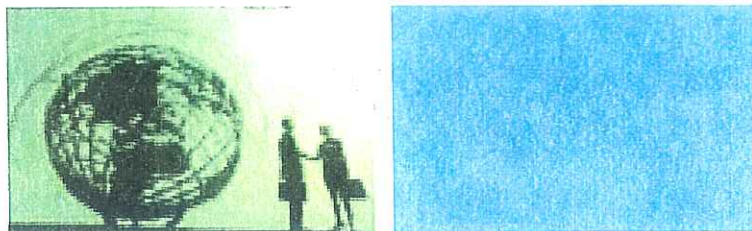
Amoco Production Company: Directed geophysical activities in the Cook Inlet, and on the North Slope of Alaska. This involved interpretation of seismic data, mapping, generating plays for drilling, preparation for lease sales, special projects in seismic stratigraphy, negotiating seismic acquisition programs and wells with partner companies, preparation of geophysical budgets, and training new personnel. Presentations were made to upper-level management on a weekly basis. Exploration efforts were extremely successful.

Publications

- Zimble, D.A., Evans, D.L., Carlson, G.R., et al. 2003. Characterizing vertical forest structure using small-footprint airborne LiDAR. *Remote Sensing the Environment*. Vol. 87 Issues 2-3. Pp. 171-182.
- McCombs, J.W., Eggleston, N.T., Evans, D.E., Parker, R.C., Carlson, G.R., Forest measurement applications of multi-return Lidar: A cooperative research project between the Southern Research Station (Forest Service) and Mississippi State University. *Proceedings of the USDA Forest Service 8th Biennial Remote Sensing Applications Conference*, April 10-14, 2000.
- Evans, D.L., McCombs, J.W., Batten, S.D., Carlson, G.R. 1998. An Aerial Forest Inventory and Monitoring System. *7th Biennial Forest Service Remote Sensing Applications Conference*, April 6-9, 1998.
- Carlson, G.R., Patel, S. 1997. A New Era Dawns for Geospatial Imagery. *GIS World*, March 1997, Ft. Collins, Colorado.
- Gunawan, I., Armstrong, L.J., Carlson, G.R. 1997. Integrating Natural Resources GIS with Oil Spill Trajectory Model: East Kalimantan. *Proceedings: BPPT Technology Symposium*, Jakarta, Indonesia
- Carlson, G.R., Henry, R.J., Pugh, J.A. 1996. Regional Forestry and Biodiversity in Tierra del Fuego, Chile. In *Raster Imagery in Geographic Information Systems*, OnWorld Press, Santa Fe, New Mexico.
- Ronshagen, C.S., Carlson, G.R., Breedlove, B.W. 1989. Integrating CAD/GIS for Environmental Planning: A Case Study. *ASPRS*, Cleveland, Ohio.
- Carlson, G.R. 1978. Geophysical Chapter, USGS Open File. Publication: B-3 C.O.S.T. Well, Washington DC.

Noel Marrero, BsCHE

Senior Wastewater Engineer



Over 25 years of experience in process design, project engineering and operations management in the pharmaceutical and service industry. Managed several WWTP projects from conceptual design to final design, construction, and operation. Has extensive hands-on experience related to the start up and operation of WWTP process related units.

Education

- BS Chemistry, University of Puerto Rico, Mayagüez Campus (1977)
- BS Chemical Engineering, University of Puerto Rico, Mayagüez Campus (1979)

Fields of Competence

- Environmental Control
- Stripper and distillation columns
- WWTP Process Engineering
- Project Engineering and Management
- WWTP Design and Construction Management
- WWTP Troubleshooting and Optimization
- WWTP Regulations and Permitting
- WWTP Laboratory Operations

Technical Courses

- Numerous Management Seminars
- OSHA, GMP, Contamination Prevention and Process Safety Management.
- HAZOP facilitator
- Energy Conservation
- WWTP Operation and Optimization

Languages

Spanish/English

Key Projects

- Lead Project Engineer for Aguas Puras del Caribe, Inc. (APCI), in which the following was developed Basis of Design Document and Preliminary & Detailed Design for the facilities that will produce 4 MGD of service and high purity water, using the effluent from the Bayamón Regional Wastewater Treatment Plant (BRWWTP) as the raw material source. It consists of secondary treatment followed by reverse osmosis units, followed by Continuous Electrodionization.
- PRASA Emergency O&M and Compliance Support during 90 day Strike. Mr. Marrero was one of the 5 licensed professional engineers experienced in O&M and compliance of potable water systems that supervised the operation of the plants including maintaining process control, sampling and analysis and other monitoring, record keeping and reporting, documentation and compliance. The project required complete O&M services in compliance with regulatory agencies requirements including EPA Region 2 (SDWA), PR EQB and PR Department of Health requirements.
- The systems operated varied in capacity from 1-70 MGDs incorporating over a dozen different treatment technologies applied to ground water and surface water sources respectively. ERM assessed nearly 100 of the facilities for compliance of their chlorine processes and practices with EPA's RMP and OSHA's PSM requirements. Sites included wastewater treatment plants, potable water filtration plants, WW pumping stations, PW pumping stations, and a central chlorine distribution center.
- PRASA Vulnerability Assessment for over 25 Potable Water Systems.
- PRASA Local Limits development project.
- Operated and modeled solvent strippers and distillation columns at Sterling (now Pfizer), Abbott, and Safety Kleen.

- Start-up and operations of several WWTP (SBRs) in the pharmaceutical and service sector.
- Managed the operation of an innovative wastewater treatment and water reclamation plant (first of its class in the pharmaceutical arena).
- Project engineer/ manager during the execution of a multimillion dollar SBR WWTP and water reclamation state-of-the-art WWTP project.
- Managed various ground and storm water optimization projects.
- Project Manager for several WWTP projects from conceptual design to final construction and operation for various pharmaceutical and chemical clients.

Sterling

- Managed the WWTP project from bench scale and pilot testing, design, construction, start-up and operation. The plant consisted of equalization, pH control, nutrient addition, SBRs and sludge digestion.
- Lead a water treatment optimization project from conceptualization to installation. The project consisted of the installation of a new R/O unit to treat water for chemical formulation purposes.
- Co-managed a centrifuge inerting automatization project for four bottom unloading centrifuges. Implement automatization by mean of individual PLC logic.
- Work on several chemical plant optimization programs and studies. The same were related to:
- filtration optimization, solvent recovery, centrifuge upgrade, final product drying and emissions control among others.
- Also as project engineer lead various facilities optimization projects in areas such as: Utilities upgrade (fuels tank relocation), Energy recovery (solvent burning at boiler) and fire protection (chemical storage sprinkler system), among others.

Abbott

- Managed WWTP upgrade project from bench scale and pilot testing, design, construction, start-up and operation. The project consisted in the installation of an equalization, receiving tanks, sludge digestion and thickening, pH control, SBRs, multimedia filtration, post equalization, and R.O. units. All processes were completely automated with PLC's and DCS.
- Managed several chemical plant methylene chloride emissions reduction project. As part of the project lead the implementation of new reactor sampling closed systems, additional cooling capabilities (condensers), seal type transfer pumps, develop a seal type system between baskets and bottom unloading centrifuge, among others.
- As Operations Manager at Abbott Puerto lead the operation, troubleshooting and process optimization for an innovative wastewater treatment and water reclamation plant (first of its class in the pharmaceutical arena).
- Abbott project engineer / manager, lead design development for a multimillion dollars expansion of a fully automated WWTP and Water reclamation plant operations.

Safety Kleen

- Managed the WWTP project from design, construction, start-up and operation. Plant consisted on equalization, SBR's and Dewatering.
- Performed various performance and optimization studies for solvent dehydration units such as molecular sieves and calcium chloride.
- Lead molecular sieve inerting system project. Project consist in the installation of a system and instrumentation.
- Co-lead solvent recovery column replacement and automatization project. Project consist in the replacement of a distillation column, still pot, overhead cooling system overhead decanter, and Process automatization through PLC logic.

- Lead solvent recovery column upgrade and automatization project. Project consisted of the upgrade of a distillation column by installing a new still pot and overhead decanter, as well as instrumentation upgrade and process automatization through PLC logic.
- Co- developed and implemented into production several solvent recovery processes for pharmaceutical manufacturing customers. Starting from pilot lab. Scale to full implementation and usage on generating process.
- Lead several tank replacement projects. The project included automatization and data gathering of level monitoring.

Pedro Panzardi & Associates

- Lead several conceptual and final design for various pharmaceutical/ chemicals clients in areas related to WWTP optimization, effluents equalization and pH control, storm run-off control, among others.
- Lead overall construction activities, commissioning and start up for an innovative used oil recycling plant operations.

Environmental Resources Management

- Developed various WWTP concepts directed toward the conservation of water.
- Developed protocols and implemented various pilot plant studies related to WWTP and water re-use.
- Provided WWTP training to operators related to plant operations and maintenance issues.
- Established WWTP laboratory support operations for a pharmaceutical plant.
- As a project engineer at Sterling Pharmaceuticals, led various facilities optimization projects such as water treatment (RO installation), WWTP piloting and design, potable water system optimization.
- At ERM-PR participated in and/or managed several WWTP conceptual and final designs for various pharmaceutical/ chemicals clients.
- ERM Project Manager in various WWTP design/built projects.

- Managed the WWTP project from bench scale and pilot testing, design, construction, start-up and operation. The plant consisted of equalization, pH control, and nutrient addition, SBRs and sludge digestion.
- Led a water treatment optimization project from conceptualization to installation. The project consisted of the installation of a new RO unit to treat water for chemical formulation purposes.
- Managed WWTP upgrade project bench scale and pilot testing, design, construction, start-up and operation. The project consisted of the installation of an equalization tank, receiving tanks, sludge digestion and thickening, pH control, SBRs, multimedia filtration, post equalization, and RO units. All processes were completely automated with PLCs and DCS.
- Led WWTP effluent and potable water GAC technology design evaluation. Developed operational guidelines.
- Managed WWTP project from design, to construction, start-up and operation. Plant consisted of equalization, SBRs, dewatering facilities, and DAF improvements.
- Co-led WWTP design project for Phillips Core. Project consisted of the design of operation units related to metals precipitation, UV disinfection, aeration, new equalization and effluent transfer capabilities.
- Co-developed and implemented into operation a process to remove solvent from wastewaters by means of distillation for a TSD. Starting from pilot lab, scaled to full implementation in plant operations.
- Led several conceptual and final designs for various pharmaceutical/ chemicals clients in areas related to WWTP optimization, effluents equalization and pH control, storm run-off, metals removal, and water recycling, and reuse.
- Managed conceptual and final design and overall construction, commissioning, and start-up activities for the installation of a WWTP effluent evaporation plant.
- Co-leader in the development of operations for a WWTP operational support laboratory.

- Has developed several WWTP Operations and Maintenance Manuals.
- Assisted in the development of WWTP bioassays studies for a pharmaceutical company.
- Participated in various audits for facilities outside P.R. Main objective was to evaluate process operations and determine appropriate water conservation and recycling alternatives as well as WWTP options.

Miguel Vázquez, PG

Hydrogeologist



Senior Geologist with 19 years' experience. Has experience in international hazardous waste sites and petroleum hydrocarbons sites as a project geologist, site manager and project manager for both commercial/industrial and government clients. Mr. Vázquez has been instrumental in working with clients and regulatory agencies to solve sensitive issues affecting project completion. Relevant project management experience includes: environmental assessment for the divestment of real estate transactions, soil and ground water assessment, and remediation, hydrogeology, ground water and solute transport modeling and asbestos inspection.

Registration

- PG, Pennsylvania, 1994
- RG, Tennessee, 1994
- PG, Georgia, 2002
- PG, North Carolina, 2002

Fields of Competence

- Hazardous Waste Regulation Compliance
- Hydrogeology
- Groundwater Modeling
- Environmental Assessment and Remediation
- Project Manager
- Geoarchaeology

Professional Affiliations

- Puerto Rico Geological Society
- Association of Ground Scientists & Engineers
- The Geological Society of America
- Bayrex Archaeology Society

Education

- BS Geology, University of Puerto Rico, 1986
- MS Advance Certification in Hydrogeology (in progress)

Technical Courses

- OSHA 40-Hour Hazardous Waste Training
- OSHA Site Supervisor
- Asbestos Inspector and Management Planer
- Project Manager
- RCRA Compliance
- Liability and Loss Prevention
- Surface Geophysical Techniques for Groundwater Assessment Investigation
- Introduction to AutoCAD
- Phase I and Phase II Site Assessment;
- The Supervisor Facing the New Challenges
- Hand-on Modeling for Petroleum Hydrocarbon Release Site
- Introduction to Fate and Transport Modeling - Bioscreen
- Advanced Environmental Services Site Assessment
- Quality Assurance Procedures

Languages

Spanish / English

Key Projects

- Provided geological consulting services for a research project conducted by the Institute of Archaeology of the University College of London and the Puerto Rican Cultural Institute. The research concerned the nature of the political-religious and economic organization of Caribbean chiefdoms (Cacicazgos), with emphasis in Puerto Rico (c. AD 1200-1500). Mr. Vázquez interpreted the subsurface profile, paleo-environmental reconstruction, Karst terrain development and evolution, and lithic resources characterization.
- Project Manager specialized on assessing the horizontal and vertical extent of petroleum hydrocarbon impacted soil and ground water.
- Subsurface characterization emphasizing the collection of data to develop future corrective actions for soil and groundwater contamination.
- Conducted and directed the completion of pilot tests for soil vapor extraction systems, air sparge systems, multi-phase extraction systems and groundwater pump and treat systems.
- Prepared corrective action plans using active remedial technologies.
- Preparing Corrective action plans using intrinsic remediation following the American Society for Testing Material (ASTM) Standards: Risk-Based Corrective Action Applied at Petroleum Release Sites (RBCA).
- Successfully submitted and obtained approval of a technical impracticability of groundwater restoration evaluation from the State of Alabama for AMOCO Oil.
- Has completed asbestos inspections for private schools and colleges as well as industrial sites in Puerto Rico and the southeast of the USA. In addition, he has completed an asbestos inspection report that includes the risk involved with the handling and maintenance of the material and recommendations on managing the material to reduce the potential for exposure.
- Managed and completed Phase I and Phase II environmental site assessment for several financial and insurance institutions, in addition to industrial clients. The environmental site assessment included evaluation of subsurface conditions, asbestos sampling, risk evaluation and cost evaluation. The environmental site assessment has been completed following the ASTM Standard: Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. Some of the clients included: NationsBank, First Union Bank, Amoco, Puerto Rico Industrial Development Corporation, and some Confidential Clients.
- Prepared and implemented several RCRA unit closure plans and change of services for several industrial clients such as: General Electric, Merck, and Westinghouse. In addition to the closure plan development, Mr. Vázquez has completed the physical closure of the RCRA Units and closure documentation.
- Completed assessment of vertical and horizontal extent of chlorinated solvents for industrial clients such as Sandoz Chemicals, General Electric, Boggs & Company and several dry cleaner companies. His activities include vertical delineation on multi-aquifer and karst terrain environment, installation and oversight of groundwater remedial system. In addition, he has completed several groundwater models to evaluate the potential to enhance the capture zone of remedial systems and risk to impact potential receptors.
- Participated in the data collection and classification of soil and rock samples for geological and geotechnical studies on the North Carolina low level radioactive waste disposal site. He also conducted slug tests, specific capacity test and participated on conducting pump test and analysis and reporting of the data, as well.
- Experience with several groundwater and solute transport models to evaluate potential aquifer behavior under simulated conditions. These simulations include capture zone, vertical and horizontal movement of ground water in a multi-layer environment, risk of contaminant impact on potential receptors, and biodegradation and natural attenuation. Mr. Vázquez has employed the following computer models: Modflow, Plume2D, Bioscreen, Biochlor, RESSQC, WhAEM, and others.
- Executed and analyzed Pump Test, Slug Test, Step draw down, Packard test
- Fracture trace analysis
- Tracer Study

Key Projects (cont.)

- Soil and rock classification
- Groundwater and Solute Transport Modeling. Seven years using Modflow and MT3D (GMS processor) for chlorinated plumes delineation and migration pathway. Used Bioscreen to delineate and project petroleum product plumes movements, WhEM to delineate wellhead protection, and Biochlor to estimate biodegradation of chlorinated solvents in Natural Attenuation evaluation as remedial option.
- Regulatory compliance evaluation
- Comprehensive Environmental Site Assessment, Compliance and Preparation of Corrective Action Plan for Soil, Groundwater and Air Assessment
- Soil and groundwater contaminant plume (LNAPL and DNAPL) delineation.
- Soil and groundwater investigation using CPT and MIP technology at CERCLA site.
- In-Situ Reactive Zone System design and installation
- Pilot test design (soil and groundwater) and execution
- Soil and groundwater remedial systems design (SVE, pump & treat, and multi-phase extraction systems) and operation and maintenance. Oversaw operation and maintenance of approximate 15 petroleum projects for Exxon, Shell, Gulf, BP and Amoco.
- Underground Storage Tank Closure for Exxon, Shell, Gulf, other.
- Health and Safety Plans preparation and compliance.
- Environmental and Safety Emergencies Response Plan preparation and execution
- Prepared the following documents: Record of Decision (ROD), Comprehensive Site Assessment Report (CSA), Corrective Action Plan (CAP), Conceptual Site Model (CSM), Phase I Site Assessment, Phase II Site Assessment, Technical Impracticability Studies, and others
- Data interpretation and report preparation
- Technical Project Manager in projects under litigation.
- Supervised and trained environmental technician and professional personnel.
- Environmental assessment and remedial design for a Municipality
- Project Director for the Puerto Rico State Department, Department of Historical Preservation of Cultural Resources. Planned and directed the Survey of Rio Grande River project.

Vilma Pérez

Geologist



Over ten (12) years of experience in the environmental field, gas exploration, and regulatory operations in compliance with local and federal regulations. Extensive experience conducting soil and water sampling for sedimentary studies, and for phases I and II to determine environmental impact of contaminants in soil and groundwater. Extensive experience evaluating groundwater and site geology for development projects for water quality. Has expertise experience assisting environmental technicians within the divisions of Underground Injection Control, Underground Storage Tanks, NPDES program, Non-point Sources Erosion Control Program. Provided guidance and skills on physical and theoretical groundwater and basic geology. Wrote the geology and the soil sections of EIA and EA reports in the states of Colorado, Wyoming, and New Mexico.

Has experience on short- term projects conducting field work for potential exploration of oil and gas fields, and coal-bed methane. Experience using seismic and geophysical data to develop stratigraphic and structural maps to model potential fields using computer software (Neuralog, GeographixSpatial Explorer).

Participated in several of the agency committees to develop, modify and implement regulatory local programs. Prepared and conducted field trips and seminars on geology and groundwater and their application to environmental problems.

Education

- MS Geology, University of Texas, El Paso, Texas, May 1997
- MA Anthropology and Linguistics, University of Florida, Gainesville, Florida, Dec 1983.
- BA Anthropology and Geography, University of Puerto Rico, Río Piedras, Puerto Rico, May 1979.

Professional Affiliations

- Geological Society of Puerto Rico
- International Erosion Control Association (IECA)

Technical Courses

- Computer: Macintosh, PC, UNIX System (Windows, NT, WordPerfect, QuattroPro, Word, CalcIsland, ERMapper, GMT, ArcView, Surfer, MapCad 2000, Adobe, Canvas), Geographix, Neuralog, and Spatial Explorer
- Others: Xeroxing, printing machines, scanner, digitizer, carpentry, construction, wood and bamboo handcraft, knitting
- 40-hour HAZWOPER
- 8-hour HAZWOPER Refresher Course

Presentations

- Environmental Quality Board: Talk on Karst Hydrogeology
- Environmental Quality Board: Seminar on Hidrology and geology of Puerto Rico
- College of Agronomists: Oral presentation on Agronomy Applied Erosion Control Measures
- Heavy Equipment Operators Association: CES Permit Regulation

Languages

- Spanish
- English
- Some French

- Puerto Rican Congress on Sustainable Development: Erosion Control Measures to Conserve the Water Quality
- 35th Annual IECA Conference: ESC: Erosion Control Regulations in a Tropical Country
- Water Quality Area, EQB: Seminar en Geology and Hydrology of Puerto Rico
- GeoGraphix User's Group Meeting: An Integration of Prizm, GES, and SeisVision in the Interpretation of a Prospect in the Green River Basin
- GSA Annual Meeting, Southwest Section: Oral presentation on Heterogeneity and Water Quality of the Rio Grande Alluvium, downtown El Paso, Texas: Final Results
- Third Inter-American Environmental Congress in Costa Rica: Oral presentation and article on Water Quality in the Rio Grande Alluvium Aquifer, downtown, El Paso: An Application
- Ninth Binational Symposium on Geohydrology in Ciudad Juárez: Oral presentation and article on Saline Intrusions from the Mesilla Bolson into the Hueco Bolson, downtown El Paso/Ciudad Juárez
- Department of Geological Sciences: Student Colloquium - Poster: Quality in the waters of the Rio Grande Alluvium, El Paso, Texas
- Southwest Section of the American Association of Petroleum Geologists Convention: Heterogeneity and Water Quality of the Rio Grande Alluvium Aquifer, Downtown El Paso

Key Projects

- Project Geologist, Energy Resources Management, Guaynabo, Puerto Rico. Responsible for management of consulting projects, participating in project development, and conducting marketing or potential clients; conducted fieldwork; responsible for employee training and development of field procedures.
- Geologist, Environmental Quality Board, Hato Rey, Puerto Rico. Worked as a Geologist evaluating groundwater and site geology for development projects within the Water Quality Area. Assisted environmental technicians in several of the divisions: Underground Injection Control, Underground Storage Tanks, NPDES Program, and Non-point Sources Erosion Control Program, evaluating site

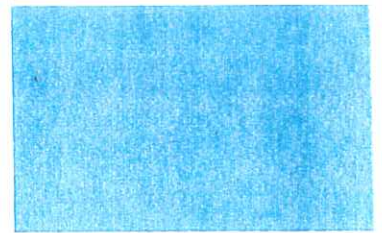
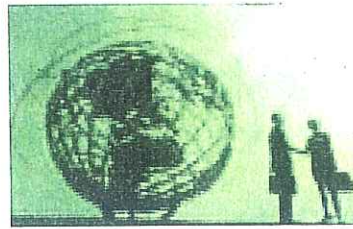
geology and providing guidance and knowledge on physical and theoretical groundwater and basic geology. Monitored and inspected sites for development and infrastructure activities. Inspected sites to describe the local geology and identify the condition of the formations for the cases where composition and structure are determinant in the integrity of the ground for construction projects. Participated in several of the agency committees to develop, modify, and implement regulatory programs for the different divisions. Attended meetings and conferences dealing with water quality methodology and water quality programs. Participated as a presenter in national and international conferences about water quality and the different aspects of erosion control and sediment prevention. Prepared and conducted fieldtrips and seminars on geology and groundwater and their application to environmental problems. Evaluated DEA, EA, and EIA and made recommendations to the Office of Scientific Counseling.

- Environmental Scientist/Geologist, Greystone Environmental/GPC, Denver, Colorado. Worked on research and developing projects for potential exploration of oil and gas fields using seismic and geophysical data; developed stratigraphic and structural maps to model potential fields using computer software (Neuralog, Geographix, Spatial Explorer). Worked on short-term projects conducting fieldwork for oil and gas exploration and coal-bed methane. Worked also with an

environmental firm that issued permits and licenses for pipelines, power plants, oil and gas, and coalbed methane. Wrote reports and proposals for grants for environmental projects; wrote geology and soil sections of EIA and EA reports in the states of Colorado, Wyoming, and New Mexico, as well as provided assistance to the scientist who worked in Latin American countries. Served as a Spanish/English interpreter; did translation work. Trained in several of the permits and government acts required in the environmental field.

- Environmental Scientist, Center for Wetland Studies, SFS, Puerto San Carlos, BCS, Mexico. Taught sustainable development courses in Puerto San Carlos, BCS, Mexico. Coordinated fieldwork; conducted direct research projects on water quality; computer work.
- Geologist, Independent Contractor, El Paso, Texas. Soil and water sampling; sedimentary studies. Phases I and II to determine environmental impact of contaminants in soil and groundwater.
- Teaching Assistant, Department of Geological Sciences, UTEP, El Paso, Texas. Taught geology labs. Computer modeling (GMT, CalcIsland, Canvas, Adobe, ER Mapper, ArcView, Grapher, Surfer).
- Science Teacher, Risinger Primary, Fabens, Texas. Taught classes to migrant children in Fabens, Texas. Participated in several school committees.
- Peace Corps Recruiter, US Peace Corps, Dallas, Texas. Recruitment activities for overseas jobs; 75% computer work: preparing and designing promotional material (Adobe); team work.
- Integrated Community Development, US Peace Corps Volunteer, Limón, Costa Rica. Worked as a Peace Corps Volunteer in community development programs; assessed environmental impact of projects: water systems, sewage systems, land survey for construction, and soil survey to determine land slides occurrence and soil stability.
- University Professor, University of Puerto Rico, Mayagüez Campus, Puerto Rico. Taught courses in Anthropology, Introductory Social Sciences, Sociology, Geography, and Geology of Puerto Rico.

Aaron Padilla, Ph.D.



Dr. Padilla is a social and environmental specialist with experience in the interface of business and society. His key skills include socio-political analysis, systems and strategy design, community-level outreach and communication, meeting and process facilitation, and project management.

Dr. Padilla has extensive experience in the integration of social and environmental issues into business operations, and the achievement of strategic objectives through corporate social responsibility. A key attribute he brings to consulting assignments is an ability to connect operations to strategy and vice versa through work in the field and in the boardroom. He has project management experience in coordinating international teams and synthesizing and delivering critical research that is relevant and actionable for clients.

Recent experience includes managing the design of a new Sustainability Management System for a multinational heavy manufacturing client in México. Dr. Padilla has managed several recent Social Impact Assessments for clients including Angola LNG, BP and Total in Angola; Chevron in Bangladesh; and Newmont in Nevada, USA. Dr. Padilla also led the Mid-Term Evaluation of the Community Investment Program of the BTC Pipeline in the Republic of Georgia.

Fields of Competence

- Corporate social responsibility
- Management systems and strategy
- Social impact assessment
- Stakeholder engagement
- Social and community investment
- Social performance evaluation
- Socio-political analysis
- Sustainable development in emerging markets
- Capacity building
- Workshop facilitation

Credentials

- Ph.D., Geography, Marshall Scholarship, University of Cambridge, 2002. Dissertation: The Globalization of Grievance: The Ogoni Movement & Corporate-Community Relations in the Niger Delta.
- M.Phil., Environment & Development, University of Cambridge, 1999. Dissertation: Community Level Sustainability of Forestry in Chile.
- B.A., International Relations, Honors in Environmental Science, Technology & Policy, Stanford University, 1997.

Languages

- Fluent in Spanish
- Some familiarity with Portuguese
- Some familiarity with Nigerian Pidgin

Key Industry Sectors

- Oil and Gas
- Mining
- Heavy Manufacturing
- IFIs
- International Organizations
- Government

Key Projects

Sustainability Management System, Confidential Heavy Manufacturing Client, Mexico, October 2005 - Present – As Project Manager managed a team in the design of a new Sustainability Management System (MS) to replace existing EHS MS. Work included collaboration with a cross-functional client working group and the innovation of a new management system architecture based on ISO, Sigma and other MS models and best practices.

Angola LNG Environmental Social and Health Impact Assessment, Houston & Angola, May 2005 - Present – Senior Technical Lead for stakeholder consultation in Angola and facilitation of workshops among consortium partners for World Bank-standard impact assessment.

Bibiyana Social Impact Assessment and Resettlement Action Plan, Chevron Bangladesh, July 2005 - Present – As Project Manager directed SIA for a world-class natural gas field in rural Bangladesh. Work included coordination of primary baseline research, design of resettlement action plan, development of SIA report, training of External Affairs staff, and facilitation of uptake of Social Management Plan with Bibiyana Project Team.

Corporate Social Responsibility Report, Burlington Resources, February 2006 – As Project Manager led a project team developing company's first Corporate CSR Report. Activities included concept design, internal interviews, text drafting and review, and coordination of graphic design.

Battle Mountain, NV Social Impact Assessment, Newmont Mining Corporation, October 2005 – As Project Manager led a team evaluating the social impacts on a small community of the closure of one gold mine, the opening of a new gold mine, and the opening of a new power plant. Work included extensive stakeholder consultation, socio-political analysis, and design of External Relations management strategies for Newmont.

CSR Strategy Review, Mid-Cap Independent Oil & Gas Company, June 2005 – As Project Manager coordinated a team assisting to design and implement a new corporate CSR strategy. Work involved benchmarking site visits and personnel interviews across the United States, and presentation of business cases for senior management consideration. Work culminated in a practical CSR action plan for the corporation.

Mid-Term Evaluation of Community Investment Program, BTC/SCP (BP) Pipelines Project Republic of Georgia, October 2004 – Led a team evaluating the effectiveness of a \$5.5 million social investment project for 77 communities along the pipeline corridor. Assessed both the success in generating sustainable development for communities and in generating value for the business.

Consultant, Extractive Sector & Sustainable Development, UK Department for International Development (DfID) Policy Unit, February 2003 – As a consultant conducted policy research for DfID on the extractive sector in emerging markets. Project included field research in Mozambique, South Africa, Botswana, Sierra Leone, Ghana, and Nigeria to understand the role of and development potential of oil, gas and mining in resource-dependent countries.

Consultant & Co-Author, Learning from the Leaders: From Principles to Practice, International Finance Corporation (IFC), October 2002 & April 2003 – As consultant and co-author provided research and reports to IFC Senior Management on implementation of business principles by corporate market leaders (3M, ABN AMRO, Barclays, Chiquita, Calvert, Duke, DuPont, Intel, Marks & Spencer, Rio Tinto, Shell, Vodafone, Volkswagen). Research included in-depth interviews with Senior Executives.

Yinka Afon

Staff Engineer



Mr. Afon is a staff engineer within ERM based in Annapolis, MD. He has over two years of consulting experience and has worked on a variety of projects. His major area of specialty is the Energy Sector (oil, gas and pipeline), where he integrates engineering principles with regulatory processes and project-specific needs. His experience encompasses environmental permitting and compliance, environmental impact statements/assessments, air and noise quality, air emissions inventory, air conformity, erosion and sediment control, stormwater management, cost benefit/offset analysis, sustainability analyses, regulatory reviews and reporting, aesthetics, and water quality.

Fields of Competence

- Environmental Permitting and Compliance
- Air and Noise Quality
- Air Conformity
- Environmental Impact Assessment
- Cost Benefit / Offset Analyses
- Regulatory Reviews and Reporting
- Environmental Statistics
- Aesthetics
- Water Quality
- Erosion and Sediment Control/Stormwater management
- Sustainability Analyses
- EPA MOBILE6.2 Modeling

Credentials

- M.S.E., Environmental Process Engineering, Johns Hopkins University, 2004.
- B.S., Chemical Engineering, Ladoke Akintola University of Technology, Nigeria, 2002.

Professional Affiliations

- Member of American Institute of Chemical Engineers (AIChE)
- Member of National Air Traffic Controllers Association (NATCA)

Languages

- Very familiar with Yoruba

Key Industry Sectors

- Energy
- Hydropower
- Transportation
- Manufacturing

Key Projects

Maritimes & Northeast Pipeline Phase IV Project, ME.
Environmental Assessment (EA) - Evaluated environmental impacts on air quality and noise associated with the proposed construction and operation of five new compressor stations and modifications to two existing compressor stations in Maine, in order to allow transmission of new supplies of natural gas from LNG receiving terminals being developed in Atlantic Canada. Reviewed air and noise quality sections of Applicant's draft Resource Reports and wrote EA sections pertaining to air quality and noise in accordance with National Environmental Policy Act (NEPA) requirements. Tasks included quantification of air emissions from the compressor stations, plus, noise levels at noise sensitive areas of the project.

Northeast Gateway Liquefied Natural Gas Project, MA.

Environmental Impact Statement (EIS) - Evaluated the environmental impacts on air quality and noise (in-air and underwater noise) associated with the proposed construction and operation of a LNG Deep Water Port (DWP) in eastern Massachusetts. Working under the direction of the U.S. Coast Guard, researched and wrote EIS sections pertaining to air and noise quality in accordance with NEPA requirements. Tasks included quantification of air emissions from construction and regasification vessels, plus, noise levels at noise sensitive areas of the project; prepared a General Air Conformity report for the project; and provided quick responses to all air and noise quality related comments from various agencies and the public.

Main Street Corridor, City of Buffalo, NY – *Environmental Assessment (EA)*

Evaluated the environmental impacts on air quality and noise for several alternatives associated with the reopening of a pedestrian plaza in Main Street to vehicular traffic as part of an overall strategy to improve multi-modal access and revitalize downtown Buffalo. The EA was prepared in accordance with NEPA requirements as well as the Council on Environmental Quality regulations. Ensured the project's air emissions conformed to New York State Implementation Plan (SIP); and performed a general noise and vibration assessment for the project in accordance with the Federal Transit Administration's (FTA) "Transit Noise and Vibration Impact Assessment" manual dated May 2006.

Crown Landing Liquefied Natural Gas Project, New Jersey.

General Air Conformity/ Offset Analysis/ Noise Analysis/ Air Permit Application - Prepared a General Air Conformity Determination report including a thorough applicability analysis and air emissions calculations/inventory for an LNG facility in New Jersey. Estimated air emissions for all aspects of the project including construction equipment, on-road mobile sources (using EPA's MOBILE6.2 Model), stationary sources, and ships in Delaware waters. Provided methods by which the LNG facility would obtain offsets (cost benefit analyses) or demonstrate compliance with New Jersey and Delaware's State Implementation Plans (SIPs) for the emissions. Assisted in preparing the air permit application for the ships at berth; and performed noise assessments for the Project's construction and operational equipment.

Massena Hydro Electric Power Project, Massena, NY.

Environmental Impact Statement (EIS) - Evaluated environmental impacts on water quality associated with the proposed construction and operation of a hydro-electric power dam in Massena, NY. Prepared an EIS in accordance with the appropriate Federal and state regulations and determined the affected environment and environmental consequences of the proposed action. Task included estimating the drainage area through USGS, stream flows, monthly flow and duration curves, and water quality standards for the proposed project area.

Bristol-Myers Squibb, Worldwide

Global Operations Impact and Sustainability Analyses -

Assisted in preparing the 2004 and 2005 sustainability reports for Bristol Meyers-Squibb. Received and analyzed raw data for all sustainability metrics including Key Performance Indicators like energy use, air emissions, waste, water use, effluents to water, transportation (green house gas emissions), etc. to determine the environmental impact of BMS's global operations.

Yadkin Hydroelectric Project Relicensing, Charlotte, NC

Recreational Use Assessment - Assisted in preparing a recreational use assessment report for a hydroelectric project consisting of four developments/reservoirs. Determined recreational profile information and evaluated project effects on recreation in the tailwaters of the four dams that comprise the project.

Project-Wide Aesthetic Study - Prepared a project-wide aesthetic study for the hydroelectric project to address and evaluate aesthetic (scenic quality) issues from different survey groups. Performed a constituent (user) analysis based on responses from the survey groups regarding Project aesthetics.

Recreation Economic Impact Study - Assisted in preparing a recreation economic impact study plan for the hydroelectric project to quantify the economic contribution of recreational use to a five county region surrounding the project.

Atotech USA, Inc., Baltimore, MD

Procurement Services- Provided procurement services and prepared contract documents for the selective dismantlement, decontamination, and transportation of key process equipment for a chemical manufacturing facility in South Carolina.

Sherwin-Williams, Beltsville, MD

Procurement Services and Raze Permit Application- Provided procurement services and prepared a Raze permit for the demolition of an abandoned warehouse and adjacent support buildings in Beltsville, MD.

Ashley Chesapeake Indian River, LLC, Chesapeake, VA

Stormwater Pollution Prevention Plan (SWPPP) - Prepared a SWPPP to address environmental issues including the removal, disposal, and consolidation of compacted soils associated with the redevelopment of a property under the Virginia Voluntary Remediation Program (VRP) in Chesapeake, VA. Ensured the site's compliance with the stormwater management criteria and implemented necessary erosion and sediment control measures. Designed four sediment traps and installed silt fence and dikes on the E&S Plan in accordance with Virginia's Public Facilities Manual (PFM).

Air National Guard, Harrisburg International Airport, PA

Environmental Impact Assessments - Performed air quality assessments associated with the proposed construction and demolition of airline terminal buildings, runway extensions, and new stationary sources (boilers) for the 193rd Special Wing at Harrisburg International Airport. Calculated emission estimates generated by criteria pollutants as a result of new boilers, grading, excavation, architectural coatings, construction equipment and commuting. Ensured the proposed action's conformity to Pennsylvania state implementation plans (SIPs).

Niagara Falls International Airport, NY

Environmental Impact Assessment - Performed air quality assessments associated with the proposed construction of a new airline terminal, runway extensions, and new stationary sources (boilers) at the Niagara Falls International Airport. Calculated emission estimates generated by criteria pollutants as a result of new boilers, grading, excavation, architectural coatings, construction equipment and commuting. Assessed air quality effects on behalf of the Buffalo-Niagara Frontier Transportation Authority for the FAA and ensured the proposed action's conformity to New York state implementation plans (SIPs).

Air National Guard, Gulfport Airspace Modification, MS

Environmental Impact Assessment - Evaluated the environmental effects of redesignating airspaces in the Northern and Southern Ranges of the Gulfport Combat Readiness Training Center (CRTC) in order to more effectively and efficiently accommodate the required training activities. Calculated the annual aircraft emissions generated from total number of sorties flown in the Northern and Southern Ranges for FY 2003 and 2004. Determined the local ambient air quality data for criteria pollutants from 2001 to 2004 at the nearest monitoring stations to both ranges using EPA's AIRSDATA website to ensure compliance with NAAQS.

CNX Marine Terminal, Baltimore, MD

NPDES Compliance Permit Planning - Evaluated the NPDES compliance permit planning for a coal handling facility in Baltimore, MD. Task included determining the hardness factors and specific metal parameters that apply to the facility's discharge. Determined the allowable effluent limitations and mass loadings in pounds per day using EPA's National Recommended Water Quality Criteria document.

Tyson Foods, Temperanceville, VA

Metal Translator Study Plan - Prepared a Metal Translator Study Plan for a food manufacturing facility in Virginia. Performed calculations to develop a ratio between total recoverable and dissolved copper for the facility's discharge, which was applied to the water quality standard to develop a new total recoverable permit limit.

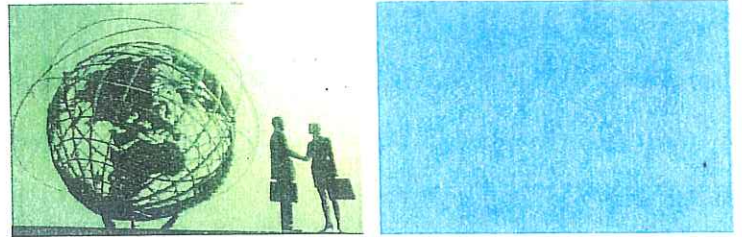
Ashley Chesapeake Indian River, LLC, Chesapeake, VA

Stormwater Pollution Prevention Plan (SWPPP) - Prepared a SWPPP to address environmental issues including the removal, disposal, and consolidation of compacted soils associated with the redevelopment of a property under the Virginia Voluntary Remediation Program (VRP) in Chesapeake, VA. Ensured the site's compliance with the stormwater management criteria and implemented

necessary erosion and sediment control measures.

Designed four sediment traps and installed silt fence and dikes on the E&S Plan in accordance with Virginia's Public Facilities Manual (PFM)

Barbara A. Mohrman



Ms. Barbara Mohrman has 25 years of experience in the environmental assessment and permitting of energy and infrastructure projects. She has been involved in domestic and international projects from site selection through construction monitoring, has been a major contributor to over 50 separate Environmental Reports and Environmental Impact Statements, has organized and run public meetings, and has represented clients as an expert witness in the areas of socioeconomics, land use, cultural resources and general environmental impacts. She has also performed environmental due diligence reviews for the divestiture, acquisition and financing of hydroelectric, gas fired, and nuclear generating facilities, and natural gas pipeline assets.

As a Project Manager, she has been responsible for the management of project schedules and costs, assignment and management of staff, client interface, and coordination of environmental studies and information. As a Consultant with another firm, Barbara was responsible for performing and managing socioeconomic, land use, aesthetic, and cultural resource investigations and for Native American consultation and Environmental Justice analysis. Barbara also has been responsible for developing bid packages, reviewing proposals and managing subcontractors. She has experience working with government agencies, both as a consultant to private industry and as an extension of agencies' staffs.

Fields of Competence

- Site selection and construction monitoring
- Socioeconomics expert witness
- Environmental due diligence
- Stakeholder meetings
- Project management
- Cultural resource investigations

Credentials

- M.U.A., Master of Urban Affairs, Boston University, 1978
- B.S., Human Development, University of New Hampshire, 1973
- Historic Preservation Planning, Cornell University
- Population Projection Methodology and Use of Microdata, U.S. Bureau of the Census Workshops
- Workshop on Revisions to Section 106, Advisory Council for Historic Preservation

Professional Affiliations

- International Association for Impact Assessment - member
- Women's Educational and Industrial Union - Trustee/Clerk
- Historic Preservation Forum, National Trust for Historic Preservation - member

Key Projects

Managed the preparation of the Draft and Final Environmental Impact Statements (EIS) for the project and related pipeline for the U.S. Coast Guard.

Managed the siting and feasibility assessment of a proposed off-shore LNG terminal and connecting pipeline. Following the identification of a preferred terminal site, a 30-mile-long pipeline (26 miles under water and four miles on land) was sited. Project activities included identification and mapping of constraints, such as bottom hazards, geology, and sensitive habitats, as well as identification of areas restricted due to navigation. Federal, state and local permit requirements were identified and a permitting plan and schedule were developed for preparing the Deepwater Port Application. Preliminary discussions were also held with the Coast Guard and other agencies concerning the acceptability of the proposed site and pipeline corridor.

Managed and performed the environmental due-diligence review of the proposed Gulfstream Pipeline for possible bank financing. Activities included the review of the permitting plan and schedule to determine feasibility and reasonableness; review of environmental documents (permits, notes from agency meetings and telephone calls, and permit applications); and determined the viability of the project based on environmental issues and permitting potential. The environmental review was provided as part of a larger review that also included engineering analysis of the project.

Served as a special technical consultant to the team that was developing a siting methodology and criteria for the selection of a new pipeline corridor in western Massachusetts. Participated in meetings to discuss methodologies and provided guidance at meetings with client panels to select siting criteria.

Managed preparation of Environmental Impact Statements (EIS) and Environmental Assessments (EA) for hydroelectric project licenses and for the oversight of tasks covered by the compliance side of FERC. General task activities included cost and schedule control, management of multidisciplinary teams, technical review of environmental documents, and oversight of subcontractor personnel. Directed up to six multidisciplinary teams simultaneously. Organized and ran site visits, and public and agency meetings. Also led cultural resource reviews and Native American consultations.

Managed the preparation of the Environmental Assessment for Maine project relicensing. Project-specific concerns required the balancing of water releases for white water rafting with the effect of reservoir drawdowns on recreational use of the impoundment and nesting habitat.

Managed the preparation of the Kennebec Basin wide FEIS (Task value \$1M), which covered the individual and inter-related impacts and operations of 11 different hydroelectric projects. Prepared support documentation for use by FERC's Hydro Working Group and other staff, and draft License orders for the Messalonskee Projects and the Edwards Project (five of the projects included in the Kennebec River Basin assessment).

Identified federal and state permitting requirements, developed a permitting plan, and managed the environmental tasks associated with the permitting of a proposed pipeline between Haverhill, MA and Portland, ME. Also consulted with state and federal agencies and worked with engineers to develop alternate routing or mitigation for areas with significant environmental or cultural constraints to permitting. (Note: this project became the southern end of the PNGTS pipeline).

Coordinated environmental analysis and preparation of sections of the Maine Site Location of Development permit application and the Natural Resources Protection

Key Projects (Con't)

Act permit application for a spent fuel storage facility. Responsibilities included management of personnel and hours, coordination of staff, technical review of draft sections, and participation in agency meetings.

Identified and evaluated potential sites for construction of an LNG terminal in southern Maine. Developed siting criteria considering federal and state regulations as well as possible local concerns. Also identified a corridor for construction of a new pipeline to connect the terminal to the interstate pipeline system and managed the cultural resource investigations at the site for SHPO consultation. Provided expert testimony in Maine superior court to allow for the relocation of an on-site 18th century burial.

Performed the siting, land use and socioeconomic assessments required to obtain permits for a new 30-mile-long natural gas pipeline to connect a proposed power plant to the interstate gas system. Activities included identification of siting criteria, siting and impact analysis, agency consultation and preparation of application materials.

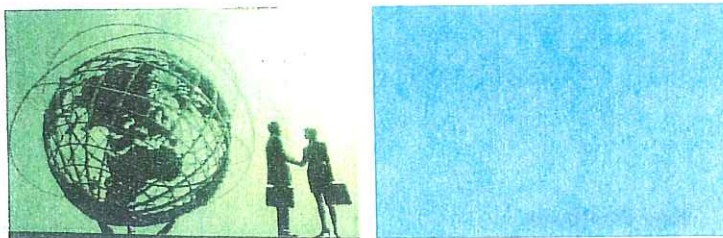
Federal and state permitting of five major pipeline expansion projects in the northeastern United States. Work was successfully completed for over 350 miles of new and looped pipeline under very tight schedules that required the simultaneous submittal of numerous permitting documents. Coordinated with agencies; oversaw the preparation of the Environmental Resource Reports for the FERC application; scheduled field surveys and coordinated fieldwork with right-of-way agents; participated in public meetings; managed scope changes; prepared and evaluated bid packages for specialty subcontractors; and managed all subcontracted cultural resource investigations, including six separate subcontractors during the peak of field activity. Also organized a successful records management system for tracking the hundreds of pieces of correspondence to and from State Historic Preservation Officers (SHPOs)

for each of the projects' pipeline segments, expanded work spaces, and pipeyards. Worked with right-of-way agents to identify mitigation options, including avoidance routing, to minimize impacts to sensitive resource areas such as archaeological sites, water crossings and wetlands, and wrote impact assessments and mitigation plans. Developed and taught a workshop dealing with cultural resource law and pipeline projects for Tenneco's construction managers, right-of-way agents and environmental inspectors.

Publications

- Mohrman, B. A., K. Hay. "Utility Corridors as Greenways: New Opportunities for Multiple Use and Public Support." Fifth International Symposium on Environmental Concerns in Rights of Way Management. Montreal, Canada, 1993.
- "Environmental Issues Under the New Administration." Stone & Webster Summer Seminar. Hyannis, MA, 1993.
- "Siting and Permitting New Electric and Gas Transmission Corridors." Speaker/Faculty Associate. Development of Utility and Abandoned Rail Corridors: New Partnerships for Multiple Use Seminar. Lincoln Institute of Land Policy. Providence, R.I., 1992.
- "Environmental Issues in the Election Year." Stone & Webster Summer Seminar. Newport, R.I., 1992
- "Siting Methodology for New Utility Corridors." Power Transmission: Access, Pricing and Regulation Conference, 1992.
- "Cultural Resource Investigations in the 1990's." Stone & Webster Summer Seminar. Boston, MA, 1990.

Ben Sussman, AICP



Mr. Sussman has eight years of experience in local and regional comprehensive planning, transportation planning, and urban design. He has helped prepare comprehensive plans for small and large cities, and has worked on projects that blend planning, transportation, and design. Other recent work includes development of regional land use scenarios, waterfront planning, municipal economic analyses, campus planning, planning policy analysis and research, evaluation of subdivision plans, and Environmental Impact Statements (EIS). Mr. Sussman places emphasis on public presentations and public engagement as part of community planning and transportation projects.

Registration

- American Institute of Certified Planners

Fields of Competence

- Comprehensive planning
- Land use planning
- Community planning
- Urban design
- Environmental Impact Statements

Credentials

- MCRP, Georgia Tech, 2002
- B.S., Science, Technology, and Society, Stanford University, 1998

Professional Affiliations

- American Planning Association

Languages

- Proficiency in French

Key Industry Sectors

- Government - local, state and federal
- Gas pipelines - limited

Key Projects

Comprehensive Plan, City of Hagerstown, MD – Project planner, analyst and principal writer for this update to the city's Comprehensive Plan. Developed plan goals, objectives, and policies in conjunction with Planning Commission. Created all maps and graphics and oversaw all editorial and layout aspects of the plan document.

Comprehensive Plan, City of Frederick, MD – Project planner and analyst for this update to the city's Comprehensive Plan. Analyzed existing employment and helped develop an Economic Profile for the city. Also compared employment trends for the city to the county, region, and nation. Oversaw all editorial, graphic, and layout aspects of the plan document.

Comprehensive Plan Revision, Washington, D.C. – Project planner and analyst for this wholesale revision of the District Elements of the Comprehensive Plan. Prepared and presented initial findings on land use patterns and comprehensive planning “best practices” to the plan's appointed Task Force. Worked with city staff to evaluate, combine, and rewrite existing land use and neighborhood conservation policies.

Bucks County Riverfront Plan, Lower Bucks County, PA – Project planner for a multi-disciplinary effort to help guide the future growth, development and redevelopment of six Pennsylvania municipalities along the Delaware River. Key issues included access to and use of the River, re-use of brownfield sites, and balancing natural and human-built resources and needs. The project combined aspects of comprehensive planning, environmental planning, economic development, and urban design. Developed general principles for the project area, as well as urban design concepts for targeted revitalization areas. Oversaw all editorial, graphic and layout aspects of the plan document.

Landscape and Setting Protection Plan, St. Mary's College of Maryland, St. Mary's City, MD – Project Planner for a study to help the College and Historic St. Mary's City evaluate the threats posed to their scenic and historic

landscape from the potential development of nearby land. The study includes an analysis of threat levels, as well as a series of recommended strategies for protection, such as fee-simple land purchases, scenic easements, and Transfer of Development Rights.

Chesapeake College Area Community Plan, Wye Mills, MD – Project planner for a study to establish a new economic development center (and Priority Funding Area) in the vicinity of Chesapeake College in Queen Anne's County. The project involves balancing economic development, community planning, and infrastructure (water and sewer) demands, while adhering to a fast-track schedule.

Worton and Butlertown Village Master Plan, Kent County, MD – Project planner for a “miniature comprehensive plan” for two adjacent rural villages in central Kent County. Worton and Butlertown are facing growth pressures, and the Village Master Plan will convey the community's vision for future land use, zoning, public facilities, open space, and urban design.

Northern Sub Area Study (NSAS), Atlanta, GA – Project Planner for a scenario-building study for the Georgia Regional Transportation Authority (GRTA). The project generated alternative forecasts for the year 2025 for a number of land use and transportation scenarios. Responsible for the allocation of forecasts to sub-county areas based on various policy, regulatory and environmental conditions.

Metrolink Extension, St. Louis, MO – Planner for a 10-mile extension of St. Louis' Metrolink light rail system. Responsible for land use and demographic analysis. Identified candidate alignments, station locations, and opportunities for development and redevelopment, with a focus on station-area development.

Central Maryland Mobility Study – Project Planner for this Maryland Department of Transportation (MDOT)-sponsored land use and transportation study that analyzed developable land, calculated development capacity, and created future development scenarios for a 600-square mile area that included portions of five counties, centered on I-95 between the Baltimore and

Key Projects (Con't)

Washington beltways. Responsible for data collection, analysis, and identification of land use and economic development trends within this important regional employment and population center.

King County Smart Growth Initiative (SGI), Seattle, WA - Project Planner for a study that linked land use patterns, transportation and travel behavior, physical activity, and public health. Developed a GIS database to link existing land uses with observed transportation and physical activity choices. Created and analyzed numerical measures of land use intensity, including residential density, intersection density, and land use mix. Three Seattle-area communities were chosen as test cases to examine the small-scale effects of land use policy changes.

SMARTAQ Project, Atlanta, GA - Planner and Researcher for the Strategies for Metropolitan Atlanta's Regional Transportation and Air Quality (SMARTAQ) research program, hosted at Georgia Tech. The project sought links between land use patterns, transportation behaviors, public health, and air quality, with the ultimate goal of reducing Atlanta's level of automobile dependence while promoting the economic, environmental and personal health of the region and its residents.

American University Open Space Master Plan, Washington, D.C. - Project Planner for the transportation portion of the Master Plan. Analyzed vehicular traffic volume, parking demand, and intersection operations, as well as pedestrian safety and facility demand.

Manassas National Battlefield Park Draft General Management Plan and Environmental Impact Statement - Project planner and document editor. Responsible for preparation of all graphics and overall editorial control of this primary planning document for Manassas National Battlefield Park.

Ridenour Community Plan, Kennesaw, GA - Project Planner for a neo-traditional development in the Atlanta area. Prepared basic site layouts to show the negative visual

and functional impact of designing the site under suburban standards. Specifically, the plans evaluated the impact of replacing the desired pedestrian-oriented retail streets with a single "big box" retailer.

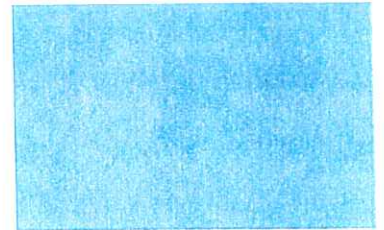
Enlibra Workbook - Collaborator and writer for two Workbook chapters. Enlibra and its associated Principles were created by the Western Governor's Association in the late 1990s in an effort to re-envision environmental regulation, protection, and management in the United States. The Workbook is designed to give specific guidance on how to incorporate the Enlibra Principles into everyday environmental management decisions and practices.

Preliminary Application Document for Hydropower Licensing, Massena, NY - Conducted initial site reconnaissance, collected data, and wrote socio-economics and cultural resources sections in support of a new hydroelectric dam in upstate New York. The document identifies existing conditions and issues that require additional research and information.

Northeast Gateway Energy Bridge, Massachusetts Bay, Third-Party Environmental Impact Statement - Working under direction of the U.S. Coast Guard, wrote and researched EIS sections pertaining to Land Use, Ocean Use, Transportation, Recreation, and Visual Resources.

Republic Services, Socioeconomic and Demographic Assessment of Potential Landfill Sites, Person County, NC - Collected and analyzed census data to determine the potential presence of Environmental Justice (EJ) populations near two potential solid waste landfill sites in North Carolina.

Carol A. Young, P.E.



Ms. Young has experience with numerical modeling; statistical analysis of natural systems; CWA compliance including Section 401, 404, 303 issues; NPDES permitting and compliance; TMDL analysis; Waste Load Allocation; point source and non-point source controls; Water Resources Development Act (WRDA); surface water quality; TRE; BMPs; hydrologic statistics; statistical analysis and stochastic model development; numerical model development; water quality, hydrologic and hydrodynamic modeling; fate and transport of contaminants in aquatic systems; WASP/DYNHYD; CORMIX; HEC-1,-2,-3,-4,-5 and -6; AGNPS; QUAL2E-UNCAS; RIVMOD; PGESTUARY; CEQUAL-W2; HSPF; TR-20,-55; SNTMP; and others.

Registration

- Licensed Professional Engineer: Virginia, Maryland

Credentials

- University of Virginia, Charlottesville, VA - MS Civil Engineering, 1991
- University of Massachusetts, Amherst, MA - BS Civil Engineering, 1984

Key Projects

Senior Engineer, Crown Landing LNG Import Terminal, New Jersey - Deputy Project Manager and Engineering Coordinator for BP's proposed LNG import terminal along the east coast of the United States. Responsible for coordination with design engineer, marine engineer, safety and security staff, dredging analysis, and lead author for engineering and physical science reports for FERC application. Responsible for overall engineering and science coordination, and CP scheduling. Coordinated and provided expert advice on significant project modifications for cost and schedule savings. Developed all stormwater, hydrologic and earthwork evaluations. Provided technical support for alternative site screening and navigation analyses. Developed permitting needs analyses and schedules. Coordinated air permitting evaluation. Coordinated all marine survey investigations including side scan, bathymetry, mag, and benthics, sediments, and dredging. Evaluated navigation and marine facility impacts.

Senior Engineer, LNG Import Terminal - Engineering lead and engineering and science coordinator for an LNG import terminal feasibility assessment in the Mid-Atlantic region. Developed navigation and dredging needs analyses. Coordinated site development requirements with site remediation.

Senior Engineer, LNG Import Facility Texas/Louisiana - Provided dredging, navigation, water quality, sediment transport, regulatory compliance and FERC documentation for a major LNG import terminal in Texas for ExxonMobil.

Project Manager of Chesapeake Bay Environmental Assessment of transportation ports and channels for Maryland Environmental Services and the Maryland Port Administration responsible for dredging of the Baltimore Harbor and access channels. Responsible for all aspects of analysis and assessment, including water quality, fisheries, benthics, economics (including transportation and port profitability), NEPA, Section 404 and 401 processes, permitting needs, and disposal options assessment.

Project Manager Beneficial Uses of Dredged Material program for Maryland Port Administration and U.S. Army Corps of Engineers. Examined feasibility of and alternatives to expansion of existing CDF. Alternatives considered were wetlands creation, land application, shallow-water habitat restoration and other beneficial uses of dredge material. Also assessed redefinition options for contaminated material to reduce demand on CDF and allow greater flexibility for beneficial uses and reduce disposal costs.

Project Engineer, Dredging options feasibility study at two reservoirs in South Carolina - Conducted engineering feasibility and NPV analysis on 20 different options including dredging and capping to determine lowest cost at least risk option for sediment management.

Bayer Corporation, Texas - Managed CORMIX computer modeling evaluation of alternate diffuser locations for Bayer's Baytown facility in Galveston Bay, TX for NPDES permit. Assessed three separate diffuser locations for the plant's waste discharge stream under a wide range of ambient and discharge conditions and negotiate a mixing zone with the state regulators. Determined effects and compatibility with navigation interests.

Senior Engineer, Superfund Site RI/FS analysis for NPL PCB-contaminated site in major lake/river system in Georgia and South Carolina - Reviewed all water quality, sediment quality and fate, and transport modeling of PCB contaminated NPL site. Demonstrated biodegradation of PCBs in a natural environment. Developed low-cost alternative to intrusive and costly remedial alternatives largely based on demonstrated biodegradation of PCBs and an analysis of the food chain/body burden relationship of contaminated fish and risk associated with consumption. Saved client nearly \$750 million.

Developed alternative cost and efficacy analysis and restructured ARAR rankings.

Project Engineer, Dredged Material characterization and treatment options, Port of Oakland, Oakland, California - Assessed costs and effectiveness of various disposal options including CDF and wetlands creation.

Senior engineer/hydrologist - Maryland-National Capital Park and Planning Commission statistical model development for land use planning and decision-making for Potomac Sub-Region and Traylor Development - Used GIS and planimetric data and habitat indices to develop a statistically-based watershed model. Performed least square multiple and partial regression, T-test, principal components analysis ANOVA, covariance testing, transformed data modeling, F-test, confidence and prediction intervals. Paper in press.

Aberdeen Proving Ground Carrying Capacity Study and Model Development, MD - Technical director for carrying capacity study to implement Integrated Natural Resources Management Plan (INRMP) for the facility. Focus is on determining what, if any, thresholds exist for various resources and developing predictive tools to project effects of facility projects, master plans, and mission on specific resources. Resources modeled include habitat, surface waters, wetlands, air quality, groundwater, and cultural resources.

Senior Engineer, Odenton Town Center, Odenton, MD - Stormwater management analysis, analysis of topographic and soil constraints on development. TR-55/-20 modeling. Integration of Rt. 32 highway engineering with Town Center.

Senior engineer, U.S. Postal Service NEPA EA, Morgantown, WV - Evaluated transportation impacts of relocation and expansion of Carrier Annex functions. Performed LOS analysis and route efficiency analysis. Evaluated applicability of AASHTO signal warrants and accessibility of throughfares and access roads for AASHTO WB-50 and WB-60 semi rigs. Evaluated noise impacts of the facilities on sensitive receptors stormwater management systems design, erosion and sediment control plans, subdivision design, traffic circulation, parking needs analysis, access restrictions, and septic/sewer and well/municipal water supply engineering and cost analysis.

Project Manager, Virginia Beach Water Supply Project, North Carolina and Virginia - Technical coordination and evaluation of hydrology of Roanoke River Basin, groundwater quality, treatability, and well safe yield analysis for southeastern Virginia, water quality impact analysis and hydrologic budget analysis for watershed-wide impact assessment.

Senior Engineer, RI/FS Evaluation OUI, Lake Hartwell, South Carolina - Evaluated sediment quality and biodegradation evidence of PCBs in natural environment, evaluated engineered stabilization and treatment alternatives, including landfilling of contaminated sediments, selective dredging, capping, and natural degradation; evaluated sediment water interaction modeling and geochemical lab data.

New York Power Authority, St. Lawrence River, NY - Developed QUAL2E model to simulate and assess water quality and in-stream habitat impacts of proposed spill program from Long Sault Dam as part of the re-licensing of the St. Lawrence-FDR Hydroelectric Project on the St. Lawrence River.

Senior Engineer, Fort Meade Watershed study, Fort George G. Meade, MD - Directed multidisciplinary team of engineers, planners, biologists, ecologists, and geomorphologists for detailed investigation of existing watershed condition and driving processes. Developed mitigation measures and costs for implementation. Developed supplemental hydrologic analysis to enhance existing TR-20 modeling that fails to adequately predict critical high frequency events which drive primary channel configuration and stable channel bed configurations.

Residential and commercial development - Senior engineer in charge of surveys, site engineering, subdivision design, traffic circulation, parking needs analysis, access restrictions, septic/sewer and well/municipal water supply engineering and cost analysis.

Project Manager and Senior Engineer, Independence Park Industrial Park, MA - Planned development of more than 3,000 acres of industrial and mixed use land in coastal community. Responsibilities included oversight of all propertyline, detail, and topographic surveys; stormwater management designs, roadway design and circulation analysis; earthwork analysis; TR-20/-55; water supply needs and analysis of impact on municipal systems; sewer layout and cost/benefit analysis of on-

site systems or package systems vs. extension of municipal services; wetlands delineations and recovery of lines; permitting; and oversaw construction.

Kempton Mine Acid Mine Drainage (AMD) remediation demonstration project, MD for Maryland Power Plant Research Program (PPRP) - Performed detailed statistical analysis of pre-, during, and post-grout injection data to determine effectiveness of use of coal combustion by-products on various metals, metals species, and acidity of mine drainage.

Senior Engineer, Natural Gas Pipeline Projects, Various Locations, East Coast, USA - Developed engineering plans and all permit packages for interstate transmission line upgrades and construction for a major natural gas provider in accordance with local, state, FERC and DOT requirements. Developed construction documents, provided field inspection and oversight. Assisted client with environmental compliance for all projects. Assisted client with land transfer and zoning issue resolution. Developed alternatives and cost saving measures for reroutes. Developed stream, floodplain and river crossing plans and application packages.

Senior Engineer, Condit Environmental Impact Statement, WA - Performed engineering design analysis and assessment, scheduling and costing evaluations of alternatives, water quality and hydrodynamics assessments, sediment transport (HEC-6) and fish passage designs. Evaluated dam removal alternatives. Directed habitat evaluation and species interaction analysis.

Senior Engineer, Sebago Lake Water Management Plan Environmental Impact Statement, Maine - Senior engineer and technical team coordinator for major EIS for alternative water level management plans for Sebago Lake in Maine. Issues involved water quality, erosion patterns, lake level management, recreation, riparian property, hydroelectric power generation, aquatic habitat, and wetlands.

Chemung River Basin, NY - Developed watershed assessment for the Upper Chemung Basin as part of a WRDA project for the U.S. Army Corps of Engineers. Evaluated watershed hydrology relative to water quality, channel condition and instream and riparian habitat. Performed time series assessment to evaluate natural meteorological hydrologic patterns and compare

with induced effects of flooding, erosion and accretion, and habitat loss.

Confidential Client, Ohio - Performed water allocation analysis for consumptive and recreational river use. Project involved calculating hydrologic, hydraulic, and water resources statistics to characterize a river and its seasonal variations. Evaluated TMDL and performed independent wasteload allocation for a variety of flow management scenarios using QUAL2E model.

Confidential Client, Cleveland Hopkins International Airport, OH - Provided surface water quality, stormwater and deicing agent management assessments for the proposed runway expansion project at Cleveland Hopkins. Assessed potential impacts to aquatic chemistry, effectiveness of mitigation measures, and hydrologic modification consequences of various runway alternatives. Evaluated wasteload implications of deicing activities on receiving water.

United States Air National Guard, various U.S. locations - Provided water quality, hydrologic and stormwater management assessments at five ANG facilities across the United States. The assessments were in support of the required NEPA documentation for various airfield facility and operational plans. Facilities included King County Airport, Willow Grove Airport, Pittsburgh International Airport, and Andrews Air Force Base.

Marriott Distribution Services, Maryland - Managed bio-monitoring program for client to ensure compliance with facility's state discharge and NPDES permits. Developed and submitted to the Maryland Department of the Environment a Plan of Study for the program. Currently developing TRE for the discharge point to determine source and methods for eliminating aquatic toxicity.

Donana Mine, Spain - Performed soil loss analysis for an inactive mine tailings site in Spain. A USLE numerical model was used to determine the amount and temporal distribution of soil-associated metals contamination that would be discharged as a non-point source to the river from the tailings deposits. The analysis was then used to determine remediation and waste management alternatives.

Senior Engineer, Avtex Fibers NPL Site, Front Royal, VA - Evaluated stormwater management and site runoff allocation and treatment needs for in-progress

remediation program for PRP (FMC). Value-engineering for reduction of treatment train flow to maximize redirection of un-contaminated discharge. Re-evaluation of "contamination" definition for direction to treatment facility.

Project Engineer, Dredged Material characterization and treatment options, Port of Oakland, Oakland, CA - Assessed costs and effectiveness of various disposal options including CDF and wetlands creation. Developed CDF simulation model to evaluate performance of metals during inflow and crust management phases.

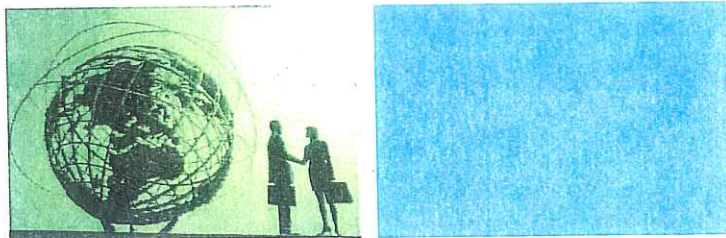
Project Engineer, Dredging options feasibility study at two reservoirs in South Carolina - Conducted engineering feasibility and NPV analysis on 20 different options to determine lowest cost at least risk option for sediment management.

Traville Project, Stormwater and Nutrient Management Plan, Montgomery County, MD - Developed a site specific nutrient, hydrologic, and sediment load analysis for a proposed development in rapidly growing Montgomery County, MD. The primary concern was stream and wetland quality impacts from development. Developed a hydrologic balance scheme for the stormwater management plan that would mimic natural conditions between recharge, runoff, and evapotranspiration. Final designs included tradition detention/retention structures, wetlands, infiltration devices, and bioretention cells.

Elm Street Development, Easton Village, MD - Developed innovative stormwater management BMP designs to optimize nutrient management for a land use conversion from agricultural use to high density residential. Issues included nutrient sensitivity of the receiving tidal waters, recharge and nutrient attenuation in the soil column, and hydrologic alteration. The final project included some least cost bioretention/detention and infiltration practices linked in series to provide nearly 100% nutrient removal.

Daniel Belin, M.S.

Ecologist/GIS Specialist



Mr. Dan Belin has eight years of experience in terrestrial and aquatic ecology and natural resource management with special expertise in Geographic Information Systems (GIS). He has diverse experience in consulting and research science for the U.S. Forest Service, U.S. Geologic Survey, and University of Massachusetts integrating scientific principals with regulatory processes and project-specific needs. Dan has conducted natural resources studies in nine states involving fisheries management, vegetation community characterization, habitat mapping, wildlife inventory, wetland delineation, and identification of unique and sensitive habitats. He has experience with regional environmental planning, including river basin studies, forest management plans, and natural resource management plans for parks and preserves.

Dan has achieved excellence in communicating and consulting with diverse groups and regulatory agencies as well as coordinating diverse, large-scale projects throughout the United States. His particular expertise and interest in projects that combine technical ecology issues with a public/stakeholder involvement process.

Fields of Competence

- Environmental impact assessment
- Integrated Natural Resource Management Plans
- GIS/CAD mapping
- Wetland determination, delineation and mitigation
- Wetland and coastal zone permitting
- Threatened and endangered species studies/surveys
- Rare plant studies/surveys
- Terrestrial wildlife studies
- NEPA permitting and documentation
- NEPA consultation

Credentials

- ESRI training - Visual Basic Programming, 2004
- ESRI training - Advanced ArcGIS, 2003
- Wetland plants identification course - Winter ID, 2003
- M.S., Forestry, University of Massachusetts, 2002
- B.A., Environmental Studies/History, Yale University, 1995

Key Industry Sectors

- Oil and Gas
- Mining and Extractive
- International Development
- Utilities

Key Projects

Excelerate Energy – Deepwater Port Liquefied Natural Gas Terminal, Gloucester, MA - Deputy Project Manager and On-Site Liaison for the U.S. Coast Guard as Third Party Contractor for Deepwater Port License application. Responsible for entire scope of Environmental Impact Statement for joint USCG/FERC application. Participated and facilitated early scoping meetings with relevant agencies and interested parties. Analyzed completeness of application and determined data gaps and areas for further study. Facilitated further study of impingement/entrainment of fish and lobster larvae as well as air modeling for conformity analysis. Conducted Section 7 consultation for both ESA and NMSA with relevant agencies. Coordinated with subcontractors and section authors for the writing of the EIS/EIR and edited document.

Environmental Justice Study - Client Confidential, Montgomery County, NC - Author and lead analyst in study assessing the socioeconomic and demographic conditions of areas surrounding four potential solid waste landfill sites. Established analysis areas around each site containing the census block group where the site is located plus adjoining block groups that could be potentially affected by increased truck traffic from landfill activities. Reviewed analysis areas by two groups of metrics for minority populations and low-income populations. These metrics were used to determine if the areas had Environmental Justice (EJ) concerns that should be considered in selecting a site for a new or expanded solid waste landfill.

3-D Analysis of Acid Mine Drainage - Maryland Department of Natural Resources, Power Plant Research Program, Kempton, MD - GIS Analyst and ecologist studying the engineering basis for developing the 100% coal combustion product (CCP) grout for use in the Kempton Manhaft and Siege of Acre demonstration projects. Used Airborne Resistivity Data with NETL CDI software to produce conductivity grids, which were then analyzed in ArcGIS Spatial Analyst to determine “hot

spots” of conductance, or areas of potential Acid Mine Drainage (AMD).

Global Operations Impact and Sustainability Analysis - Bristol-Myers Squibb (www.bms.com/ehs) - Analyst, statistician, and author working with Bristol-Myers Squibb on corporate environmental and sustainability reporting. Received and analyzed raw data for all environmental and sustainability metrics for each facility globally and prepared summary statistics, charts, and trends for operations from 2000 to 2004. Integrated these results in the annual report. Both the printed report and web site are based on the 2002 GRI guidelines. The Bristol-Myers Squibb corporate report is noteworthy in several respects, including high marks from external reviewers at UNEP/Sustainability, Tomorrow magazine, and the Council on Economic Priorities. The report includes expanded coverage of social and economic issues, in addition to environment, health, and safety. The web site is widely recognized as one of the best corporate sites and has been a case study on the UNEP website.

Sustainable Development Analysis Study - Aberdeen Proving Ground (APG), Aberdeen, MD - Ecologist, statistician and programmer working with APG in conjunction with USACOE – Baltimore District to develop tools that APG staff can use to evaluate the direct and cumulative environmental effects of construction, operation, and maintenance activities at APG. Helped developed unique open-end GIS-based program that utilizes ecological data from natural resource GIS layers to calculate the short- and long-term effects of proposed projects on various environmental resources. The program automates carrying capacity analyses for forest interior dwelling birds, grassland breeding birds, bald eagles, and key habitats. The program modified a forest fragmentation model (FRAGSTAT) to conduct an overall habitat fragmentation analysis for APG and identified important conservation areas and potential development areas. Currently developing an aquatic habitat/water quality analysis tool to help APG manage development

to maintain/protect their freshwater aquatic habitats. Derived statistical relationships between and among variables affecting biotic integrity. Programmed with Visual Basic to provide results of analysis.

Liquefied Natural Gas Terminal - BP America, Nortonville, NJ - Lead GIS analyst and ecologist in charge of mapping and analysis for entire scope of Resource Reports for FERC application. Assisted in writing Resource Report describing and analyzing various alternatives to the project, its location, and scope. Used GIS to determine areas of impact and concern, particularly on wetlands and subtidal shallows. Delineated wetlands in field. Coordinated with subcontractors to integrate CAD and GIS mapping technologies. Utilized GIS to craft alternatives analysis and determine land use conflicts with siting of proposed project. Interacted with USACOE-Philadelphia to resolve wetland determination.

Hydroelectric Relicensing - Portland General Electric (PGE), Portland, OR - Ecologist and GIS specialist on PGE hydroelectric relicensing projects. Provided technical expertise within working groups and facilitated coordination among natural resource trustees on ecological issues. Key issues included effects of the project on water quality and quantity, hydrologic models, wildlife and habitat, threatened and endangered plant and animal species, habitat loss, habitat connectivity/fragmentation and wildlife movement, and establishment and spread of exotic species. Prepared Environmental Impact Statement and coordinated with stakeholder groups to identify and scope field studies necessary to address stakeholder issues. Edited and reviewed contractor reports on field studies to ensure technical adequacy and FERC/NEPA compliance.

Anne Arundel Department of Parks - Sensitive Area Assessment, MD - GIS Analyst and ecologist on high profile project to evaluate five county-owned parcels to determine their environmental sensitivity and development potential. Conducted detailed habitat

mapping, wetland delineation verification, vernal pool surveys, aquatic habitat surveys including physical habitat, fish, and macroinvertebrate surveys, breeding bird and amphibian surveys, and endangered species surveys. Developed GIS database detailing vegetation communities, wildlife sightings, and threatened and endangered species and habitats. Developed extensive environmental sensitivity mapping and conducted development constraints analysis.

Biodiversity Workshop Facilitation - Defenders of Wildlife, Portland, OR - GIS specialist and ecologist for a nationally-attended conservation network design workshop sponsored by Defenders of Wildlife, an international conservation organization. Developed real-time GIS mapping and spatial analysis of conservation network designs for the workshop. Mapped significant habitat and critical areas for rare species in the Puget Trough Eco-Region of Washington State. Collected and managed data from diverse sources and multiple agencies. Helped develop web-based documentation of the workshop for inclusion on Defenders of Wildlife website.

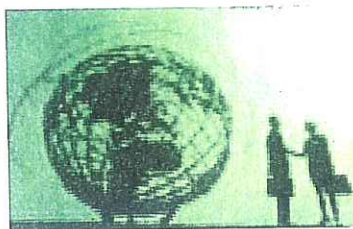
Wetland Determination - State Highway Administration, Annapolis and New Carrollton, MD - Lead GIS analyst and ecologist performing site assessment, wetland reconnaissance, and floodplain determination for properties owned by the State Highway Administration. Created cover type, soils, habitat, wetland, and floodplain maps using GIS software, Maryland DNR shapefiles, and digitized Prince George's County ultimate floodplain maps.

Publications

- Belin, D.L. and D. Kittredge 2005. "Assessing Private Forest Owner Attitudes Toward Ecosystem-Based Management." *Journal of Forestry* January/February 2005 (28-35).

Edward M. Buchak

Manager, Surfacewater Modeling Group



Edward M. Buchak's experience since 1972 has been in developing and applying hydrodynamic and water quality models to rivers, lakes, reservoirs, estuaries and coastal waterbodies. He has written several types of models in one, two, and three spatial dimensions, the most well known of which is the time-varying, longitudinal-vertical hydrodynamic and transport computation, CE-QUAL-W2. This model is a finite difference solution to the laterally averaged Navier-Stokes, continuity, state and constituent balance equations. Mr. Buchak has completed approximately 50 applications CE-QUAL-W2 is support EIS's, discharge permit applications, optimization of engineering facilities, and water quality studies. Beginning in 1985, Mr. Buchak has developed a 3-D model with similar capabilities and has completed approximately 35 applications.

Mr. Buchak is a skilled communicator of technical information, in both written and oral forms. Besides supporting technical studies and model applications before public agencies on behalf of clients in the electric utility, hydropower, and gas and oil industries, he has presented a number of CE-QUAL-W2 and 3-D modeling workshops to such groups as the North American Lake Management Society, the Bureau of Reclamation, the United States Geological Survey, the New York City Department of Environmental Protection, and Qatar's Environment Department. He has published and presented numerous professional papers and has been an invited speaker at professional conferences, most recently at WEF's Watershed 2000 in Vancouver, B.C.

Mr. Buchak contributes experience in problem definition, in managing projects to budget and schedule, and in presenting results to clients and the general public.

Professional Affiliations and Registrations

- Professional Hydrologist, Certificate No. 474, Certified by the American Institute of Hydrology
- American Society of Civil Engineers
- North American Lake Management Society
- American Association for the Advancement of Science

Fields of Competence

- Riverine, lacustrine, estuarine and coastal hydrodynamics and transport
- Development and application of hydrodynamic and water quality models
- Environmental assessments
- Modeling for reservoir operations and management
- Modeling for cooling lake and cooling pond performance evaluations
- Field data program design
- Project management and public presentations; workshop development and presentation

Education

- M.Sc. (Civil and Urban Engineering), University of Pennsylvania, Philadelphia, Pennsylvania, 1972
- B.S.C.E., Massachusetts Institute of Technology, Cambridge, Massachusetts, 1971

Key Industry Sectors

- Electric Utility (fossil fuel, nuclear and hydropower)
- Water supply
- Industrial and Chemical
- Oil and Gas

Honors and Awards

- 1971-1972 Ford Fellow, University of Pennsylvania

Selected Publications

- Kolluru, V. S., E. M. Buchak and P. E. Brinkmann. 2003. "Hydrodynamic Modeling of a Coastal LNG Cooling Water Discharge" in *The Journal of Energy Engineering*. Proceedings of the American Society of Civil Engineers, Vol. 129, No. 1, pp. 16-31. ISSN 0733-9453/2003/1-16-31/\$18.00.
- Stoddard, A., E. M. Buchak, and J. C. Imhoff. 2002. "Evaluation of Contaminated Sediment Fate and Transport Models." Task 1: Develop Evaluation Criteria. (June)". Task 2: Identify Candidate Models (August). Prepared for National Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency. Contract Number 68-C-01-037, Work Assignment No. 1-10. June.
- Jain, R., Jarrett, G. L. and Buchak, E. M. 2002. "Watershed and Reservoir Modeling in the Crum Creek Watershed." Accepted for presentation at the AWRA Annual 2002 Meeting.
- Buchak, E. M. and R. Jain. 1998. "Visualization of CE-QUAL-W2 Modeling Results and Field Data in Lakes and Reservoirs." Presented at the North America Lake Management Society 18th International Symposium held in Banff, Alberta, Canada on November 10-13, 1998.
- Buchak, E. M. and E. Moran. 1998. "Modeling Hypolimnetic Withdrawals and Seiching in Cayuga Lake, NY." Presented at the North America Lake Management Society 18th International Symposium held in Banff, Alberta, Canada on November 10-13, 1998.
- Jain, R., Buchak, E. M. and Harmon, P. L. 1998. "Integration of a Bioenergetic Model With a One-Dimensional Hydrodynamic And Temperature Model to Conduct Biological Assessment in a Trout Stream." In: Proceedings of the Wetlands Engineering and River Restoration Conference, held in Denver, Colorado on March 22-27, 1998. American Society of Civil Engineers.
- Edinger, J. E., E. M. Buchak and Z. Zhang. 1994. "An Alternate Formulation of Laterally Averaged Hydrodynamics" in the *Journal of Hydraulic Engineering*. Proceedings of the American Society of Civil Engineers, Vol. 120, No. 7, pp. 886-891. ISSN 0733-9429. CODEN: JHEND8. July.
- Edinger, J. E. and E. M. Buchak. 1993. "Temperature Modelling for Instream Flow Studies" in *Hydrological Science and Technology*, the *Journal of the American Institute of Hydrology*. Vol. 8, No. 1-4, pp. 24-33. June.
- Buchak, E. M., C. B. James and A. C. Mitchell. 1991. "Nechako Reservoir Mathematical Modelling Studies." Presented at the 1991 Annual Conference of the Canadian Society for Civil Engineering, 10th Canadian Hydrotechnical Conference and Engineering Mechanics Symposium. Vancouver, British Columbia. May 29.
- Buchak, E. M. and J. E. Edinger. 1989. "Comparison of Computed and Observed Velocities at Three Estuarine Sites." Estuarine and Coastal Modeling: Proceedings of the Estuarine and Coastal Circulation and Pollution Transport Model Data Comparison Specialty Conference. Waterway, Port, Coastal and Ocean Division, American Society of Civil Engineers. Malcolm L. Spaulding, Ed. Newport, Rhode Island. November 17-19.
- Buchak, E. M., J. E. Edinger, J. J. Loos and E. S. Perry. 1989. "Larval Transport and Entrainment Modeling for the Patuxent Estuary." Presented at the Tenth Biennial International Estuarine Research Conference, Estuarine Research Federation, Baltimore, Maryland, October 11.
- Boatman, C. D. and E. M. Buchak. 1987. "Application of an Ecosystem/Water Quality Model as a Tool for Managing Estuarine Water Quality." In: Proc. Fifth Sym. on Coastal Ocean Management, ASCE, Vol. 3, Seattle, Washington, p. 3932-3945.
- Johnson, M. C., D. E. Ford, E. M. Buchak and J. E. Edinger. 1981. "Analyzing Storm Event Data from DeGray Lake, Arkansas Using LARM." Presented at the American Society of Civil Engineers, 1981 Convention and Exposition, St. Louis, Missouri.
- Edinger, J. E. and E. M. Buchak. 1978. "Reservoir Longitudinal and Vertical Implicit Hydrodynamics in Environmental Effects of Hydraulic Engineering Works." Presented at Knoxville, Tennessee, proceedings of an International Symposium. September.

Key Projects

Old Hickory Lake CE-QUAL-W2 modeling, Nashville, TN. Set up CE-QUAL-W2 for low, typical and high flow simulation years. A special feature of this model application was the emphasis on effects of embayment volume on travel time and water quality. This feature and observed dissolved oxygen supersaturation at the surface required considerable investigation of simulation results and code modifications.

Nechako Reservoir Selective Withdrawal Studies, Alcan, British Columbia. Applied CE-QUAL-W2 to the Nechako Reservoir (150 km in length with five main basins and depths up to 300 m). Calibrated and verified model then simulated three years' operations with new release works intended to generate additional electricity and maintain optimal downstream temperatures for salmon. Developed algorithms for selective withdrawal operations to examine failure rate relative to required downstream temperatures.

Sammamish River Water Temperature Studies, Seattle, WA. Applied CE-QUAL-W2, the Corps reservoir water quality model, to the Sammamish River, a 20 km river segment connecting Lake Sammamish with Lake Washington. Of particular importance in fishery restoration efforts is the summer temperature regime, which currently is too high to support desired species. Management options considered include riparian planting to increase shading, groundwater augmentation and reduction of surface withdrawals.

Lake Mohave CE-QUAL-W2 water quality modeling, Las Vegas, NV. The primary objective of this study is to provide the Southern Nevada Water Authority and the Metropolitan Water District of Southern California with a CE-QUAL-W2 application capable of estimating changes in the water quality of Lake Mohave and its downstream releases due to the discharge of additional phosphorus at the upper end of Lake Mohave. The model has been set up for the periods 1977-1978 and 1981-1982. The model grid was developed from HEC-RAS data sets available for the lake using a program written by JEEAI and modified further for this application.

Thermal Impacts of STP Upgrade, Spring Creek, PA. Prepared 1-D modeling of temperature regime; oversaw brown trout fish physiology modeling; made multiple presentations to state agencies and negotiated a new

NPDES permit. The centerpiece of the technical work was the combination of 1-D hydrodynamic and temperature modeling supported by an extensive data collection program with a bioenergetic model parameterized for brown trout using an extensive data set derived from published laboratory measurements of brown trout growth and consumption at different fish sizes, food availability and water temperatures.

Sheep Creek Impoundment Sedimentation Studies, Echo Bay Mines, Alaska. Applied CE-QUAL-W2 to a proposed mine tailings impoundment to determine sedimentation rates and suspended solids concentrations in overlying water column over the 13 year life of the mine. Presented and defended computations to EPA staff.

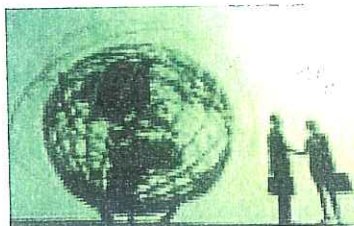
Lake Source Cooling Impact Analysis/Cayuga Lake, NY. The study required investigating the effects of removing cool water from the bottom of the lake and returning warm water to the surface of the lake. CE-QUAL-W2 was used to analyze the water and heat budgets and to make 10 year simulations to identify extreme conditions. The model was calibrated using a multi-level thermistor chain that allowed seiche activity to be recorded on a fine time scale. The calibration required that the Fortran source code be modified to incorporate a new wind shear formulation.

Cooling Lake Performance Study Comanche Peak Nuclear, TX. Wrote work scope and negotiated budget and schedule; designed GEMSS 3-D modeling effort and field data collection program; QA activities; develop long-term system model for frequency of occurrence of extreme temperature events; prepared reports and presentations

Maggie Creek Dewatering Impacts, Newmont Gold Company, Carlin, NV. One-dimensional model to quantify changes in the Maggie Creek-Humboldt River system due to mine dewatering operations. The model incorporates the thermal performance of a reservoir used to hold and cool the discharge prior to its release to Maggie Creek. Developed work scope, modeling, and report. Response to comments from regulatory agency reviews.

George A. Krallis

Senior Scientist



Application of hydrodynamic, transport and fate models to assess the impact of thermal, sediment, and pollutant discharges on aquatic resources in estuaries, rivers, lakes, and reservoirs. He is currently applying and maintaining the 3-D GEMSS hydrodynamic and transport model with the latest numerical, scientific and programming techniques. 1-D, 2-D and 3-D numerical modeling of coastal, riverine, and reservoir processes including hydrodynamics, pollutant transport and fate, water quality, sediment transport, and 316(a) and (b) evaluations, using GEMSS, GLLVHT, CE-QUAL-W2, HEC-HMS, HEC-RAS, WSPRO, PSRM, TR-20, TR-55, SWMM, DR3M, KYPIPE, CE-QUAL-R1, RIV1, QUAL-2E, CORMIX models.

Registration

- Professional Engineer (Civil) Massachusetts, 1994
- Professional Hydrologist, American Institute of Hydrology, 2004

Fields of Competence

- Hydraulic and Hydrologic studies
- Hydraulic and Hydrologic modeling
- Water Quality
- Sediment transport

Credentials

- Ph.D., Civil Engineering, Lehigh University, June 2000
- M.S., Civil Engineering, Pennsylvania State University, May 1991
- B.S., Civil Engineering, Lehigh University, June 1986

Professional Affiliations

- American Society of Civil Engineers
- American Institute of Hydrology
- Sigma Xi
- Chi Epsilon
- Tau Beta Pi
- Fritz Engineering Research Society

Publications

- Hubertz, John M., John E. Edinger, George A. Krallis, Shwet Prakash. "Use of a Numerical Modeling System to Study the Relationship between Physical and Biochemical Processes in an Estuary on the Southwest Coast of Florida." The Seventh International Marine Environmental Modeling Seminar, Washington, D.C. October 19-21, 2004.

Publications (Con't)

- Krallis, George A. and Edward M. Buchak. "Systematic Calibration of a Hydrodynamic and Water Quality Model." 15th ASCE Engineering Mechanics Conference, Columbia University, New York, NY. June 2-5, 2002.
- Krallis, George A. "Modeling the Unsteady, Mean-Shear Component of Wind-Induced Mixing in Lakes." Ph.D. Dissertation, Lehigh University, Bethlehem, PA. May 2000.
- Krallis, George A. and Richard N. Weisman. "Hydrodynamic Mixing Classification of Lakes." ASCE Joint Conference on Water Resources Engineering and Water Resources Planning & Management, Minneapolis, MN. July 30, 2000.
- Joseph R. Reed, David F. Kibler, and George A. Krallis. "Experiments with Wind Effects on Pavement Runoff." In the Proceedings of the ASCE National Conference on Hydraulic Engineering, Baltimore, MD. August 3-5, 1992.
- Joseph R. Reed and George A. Krallis. "Resistance to Rainfall Runoff on a Textured Surface." In the Proceedings of the International Conference on Channel Flow and Catchment Runoff: Centennial of Mannings Formula and Kuichlings Rational Formula, University of Virginia. May 22-26, 1989.
- Joseph R. Reed, David F. Kibler, George A. Krallis, and Satish K. Agrawal. "Modeling the Effects of Wind on Pavement Runoff." In the Proceedings of the ASCE National Conference on Hydraulic Engineering, Colorado Springs, CO. August 8-12, 1988.
- David F. Kibler and George A. Krallis. "Model Choice and Scale in Urban Drainage Design." In the Proceedings of the ASCE National Conference on Hydraulic Engineering, Williamsburg, VA. August 3-7, 1987.

Key Projects

Performed a modeling study of the cooling water system of Nebraska Public Power District's Gerald Gentleman Station in Sutherland, NE. NPPD sought a model to assess alternatives to increase the efficiency of the cooling pond so that as GGS utilization increases, the instantaneous temperature limit is not exceeded. The study had two primary objectives: 1) to examine cooling pond dynamics and modifications that increase its efficiency, using a 3-D model; and 2) to examine how each alternative affects the frequency and duration of

exceedences under increased waste heat load, using a fully mixed model.

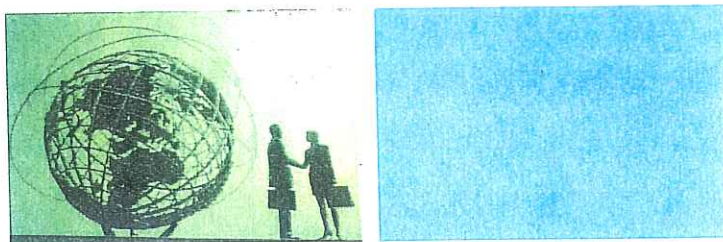
Provided modeling and data analysis for a 316(a) demonstration assessment, thermal discharge monitoring and modeling effort for PPL, Brunner Island Steam Electric Station, York Haven, PA. The work involved continuous thermal monitoring and 3D plume modeling of the discharge. Specific project tasks included participation in agency discussions, drafting and finalizing approved work plan, coordinating monitoring studies, modeling thermal discharge/river interaction, and preparing final report.

Performed thermal modeling studies of cooling water discharge at the Willamette Industries - Johnsonburg Paper Mill as part of their 316(a) permit application. The thermal plume mapping of observed data and numerical modeling of alternatives were performed using a fully-mixed model developed for this project. The analysis estimated the effects of existing and anticipated thermal discharges on the Clarion River, and assessed the effects on the important biological species in the Clarion River under different flow conditions with and without the Paper Mill.

Evaluated the effects of installing a submerged weir upstream of the Alabama Power Co., Logan Martin Reservoir Dam to improve DO content of the outflow by maintaining a well-mixed forebay consisting mostly of high DO water skimmed by the weir. A complication was that flow out of LMR consisted of power generation releases as well as ground water leakage from the forebay area. The GEMSS model was used to simulate and evaluate different submerged weir alternatives. The DO content of forebay water was controlled by several in-reservoir processes: atmospheric exchange, sediment oxygen demand, and algal photosynthesis and respiration, all included in the GEMSS model. When considering the submerged weir, the effect of these processes on the DO of the water released further depends on contact time and effective area, as well as the corresponding kinetic rate of DO depletion or addition from each process. In addition to the water quality effects mentioned, mixing processes related to selective withdrawal and weir height were also included in the model.

James S. Margolis

Partner



Mr. James Margolis is one of ERM's senior environmental, health and safety (EHS) management consulting practitioners in the North America. He leads ERM's North American EHS Management System Practice. He has over 20 years of professional experience; the last 15 focused on helping multinational companies obtain business value through improved EHS management.

James has led comprehensive enterprise-wide reviews of EHS management effectiveness for dozens of organizations and developed and implemented improved EHS management systems contributing to significant reductions in safety incidents, environmental impacts, and EHS costs. His clients span a wide range of industry sectors, including those based in the US and abroad. During the course of his career, James has visited over 150 industrial sites and developed and led dozens of EHS management training courses, seminars and workshops (including a major role in designing and facilitating ERM's Business Integration Forums). He has helped numerous companies implement ISO 14001 and OHSAS 18001 management systems, including large multi-site implementations.

Prior to joining ERM, James spent 11 years with Arthur D. Little and six years with Deloitte & Touche. He started his career as an engineer at Texaco's Port Arthur Plant. He has lived abroad and has a working knowledge of Spanish.

Fields of Competence

- Management Systems
- Strategy and Organization
- Corporate Policies and Standards
- Key Performance Indicators and Reporting
- Auditing
- Corporate Social Responsibility
- Project Management
- Meeting Design and Facilitation
- Training
- Benchmarking

Credentials

- MBA, Kellogg Graduate School of Management, Northwestern University, 1984
- BSCE, Tufts University, 1982

Languages

- Working knowledge of Spanish

Key Projects

Baxter International – Assisted in developing corporate policies and standards, designing and implementing EHS management systems, developing long-range EHS targets, and developing an EHS strategic plan.

Cemex – Assisted in developing a sustainability management system and policy. Now assisting with implementation, including a sustainability toolbox, training and pilot implementations at a sampling of operations globally.

Duke Energy – Conducted an enterprise-wide EHS management systems assessment, including 12 business units and the corporate level. Helped develop Duke's ongoing EHS management systems audit program.

Lockheed Martin – Developed the design for the EHS management systems module of their internal EHS website. Developed an ISO 14001-compatible risk management tool.

Pepsi Bottling Group – Conducted a detailed review of safety management systems and culture. Developed recommendations that contributed to significant reductions in accident frequency and workers' compensation costs.

Rio Tinto – Conducted external assurance on the implementation of "The Way We Work," the company's core non-financial management principles. Included visits to several North American operating locations.

Whirlpool – Conducted a review of corporate-level EHS management systems. Currently assisting with a redesign of the corporate EHS audit program.

Other EHS management clients have included Abbott Labs, Acuity Brands, Alberto Culver, Alpharma, Anheuser-Busch, Barrick Gold, BHP Billiton, Boeing, BP, Celanese Acetate, Cemex, ChevronTexaco, Del Monte, Delphi, Entergy, Exelon, Foamex, Hercules, Hewlett-Packard, Imerys, Invensys, Marathon Oil, Medtronic, MedImmune, Merck, Metropolitan Water District of Southern California, Ontario Power Generation, Southern California Edison, Pemex, PepsiCo, PSEG, Reliant Energy, Rohm & Haas, Siemens, Suncor Energy, United Parcel Service, US Department of Energy, USG, Waste Management, Whirlpool, and The World Bank.

Janice Gabucan

Consultant

Janice Gabucan is a consultant based in ERM's New York City office. Janice focuses on Strategic Advice, specializing in corporate social responsibility (CSR) as well as sustainable development.

As part of the Strategic Advice team, Janice contributes to projects concerning business risks and opportunities in the area of environmental, economic and social impacts. Janice has helped to develop corporate EHS strategies and corporate EHS reports. She also works on Environmental Impact Assessment projects, providing analysis of socioeconomic and other impacts.

As part of the economics and planning team, Janice contributes to projects relating to sustainable development concerning economic and financial assessment.

Fields of Competence

Corporate Social Responsibility (CSR)
Environmental Reporting
Environmental Management Systems
Socioeconomic Analysis
Policy & Economics
Cost Benefit Analysis

Education

Columbia University, 2002-2004, New York City, USA,
Masters in International Affairs, Specialization:
Environmental Policy, Management and Economics.
Awarded SIPA Dean's Fellowship:
Environmental Policy Studies.

Wesleyan University, 1995-1998, Middletown, USA,
Bachelor of Arts in Government
Awarded Departmental Honors
Honors Thesis: Agrarian Reform in Perspective.

Languages

English (native)
French (working knowledge)
Spanish (working knowledge)
Filipino Visaya dialect (basic working knowledge)
Arabic (basic knowledge)

Trainings

SA 8000 social auditing

Projects Summaries

Strategic Advice/Corporate Social Responsibility

Citizenship Report Update, Becton Dickinson (BD), 2006. Working in a small team, Janice helped to provide input into, and actually updating, BD's citizenship report's content, tone and data using as a baseline BD's peer companies' approaches, best practice, and requests for information to BD from analysts and non-governmental organizations.

ISO 14001 Environmental Management System (EMS) Development, Mitsubishi Heavy Industries America (MHIA), 2006-2007. Developed a management system for Mitsubishi Heavy Industries Americas that conforms with the ISO 14001 standard. Janice developed a manual, site-specific environmental management procedures and supporting documentation templates in collaboration with MHIA's corporate staff.

Review of Pfizer submission to Dow Jones Sustainability Report, 2006-2007. Entails a review of the company's responses to the request for information for the Dow Jones Sustainability report with an eye toward better and more accurate representation of Pfizer's efforts in incorporating elements of CSR in its business.

FASB FIN47 Conditional Asset Retirement Obligations Assessment, Becton Dickinson (BD), 2006. Assessed the potential asset retirement obligations arising from the company's global operations, which include the manufacture of medical instruments and machines.

FASB FIN47 Conditional Asset Retirement Obligations Assessment, Varian, 2006. Assessed the potential asset retirement obligations arising from the company's global operations, which include the manufacture of medical machines.

FASB FIN47 Conditional Asset Retirement Obligations Assessment, Avery Dennison, 2006 Assessed the potential asset retirement obligations arising from the company's global operations, which include the manufacture of various surface coatings

FASB FIN47 Conditional Asset Retirement Obligations Assessment, Affinia, 2006-2007. Assessed the potential asset retirement obligations arising from the company's global operations, which include the manufacture of

under vehicle and under hood auto parts.

Background Report for Proposed Partnership between the World Wildlife Fund and an Anonymous Electronics company, 2006. Analyzed an electronics company's performance in the areas of air, water and waste sustainability and benchmarked its performance against that of two other electronics companies. Janice also assessed the risks and opportunities of the potential partnership.

Pfizer Environmental Health and Safety website 2005-present. Reviewed and updated Pfizer's health and safety website with EHS quantitative and qualitative data and case studies. Also developed the EHS newsletter in 2005, which was distributed to EHS managers globally. Thirdly, reviewed EHS indicators and developed concepts for website and newsletter feature articles.

Study of Applicability and Opportunities of Finnish Indoor and Ambient Air Technologies in North American Markets, National Technology Agency of Finland (Tekes), 2005-2006. Janice researched the applicable regulations and market opportunities and limitations for an array of Finnish clean air products in US and Canadian markets for industrial, ambient and transportation-related clean air technologies. Janice then provided strategies for market penetration based on the regulations and opportunities found.

Benchmarking against peers in the Dow Jones Sustainability Index (DJSI), Barrick Gold, 2006. Barrick Gold and other mining company peers included in the DJSI were benchmarked against one another in terms of their performance in social, economic and environmental impact management. These results were incorporated into the company's larger corporate sustainability strategy.

EMS Training Program, UBS AG, 2006. Janice is working with a three person team who will guide and advise the Information Technology (IT) unit as it develops training for UBS staff on its Environmental Management System. The project scope includes a gap analysis and guiding IT personnel in choosing between training topics such as waste handling, energy management and procurement.

Corporate Responsibility Strategy, Corning, 2005. Corporate Responsibility strategy options were

developed for the client's corporate division to consider as part of their future strategy. Janice did research and analysis of pressures and drivers for such a strategy. These included regulations, customer and investor concerns, and the strategies of peer companies.

Environmental Management System Design, Green City Transportation, 2005. Janice, as part of a two person team, designed an ISO14001-based Environmental Management System (EMS) for a car service company specializing in hybrid cars. The project scope includes creating a schematic of the company's environmental impacts, researching relevant regulations and best management practices, and creating a schedule of activities for the staff.

Review of Options for Social Investments, Amerada Hess, 2005. Using a desk based research on local NGOs and country needs, Janice performed a review of health and education investment options for locations near the client's operations and corporate offices in Russia, Asia, North Africa and various US cities.

Stakeholder Identification for a Proposed Power Plant Expansion, City of Holland, MI, 2005. Janice performed desk-based research web sources for potential environmental and community stakeholders in a proposed coal power plant expansion, which formed the baseline for ERM's stakeholder engagement process done on behalf of the client.

Benchmarking against peers in the Dow Jones Sustainability Index (DJSI), PepsiCo Inc., 2005. PepsiCo and other food and beverage company peers included in the DJSI were benchmarked against one another in terms of their performance in social, economic and environmental impact management. These results were incorporated into the company's larger corporate sustainability strategy.

Analysis of Valuation Techniques for Groundwater Remediation, Genesco, 2005. Janice analyzed financial, economic and hydrological valuation approaches for estimating the value of damages arising from a specific contaminated groundwater plume. The project also considered reparation options to affected parties.

Review of Dow Jones Sustainability Group Information Submittal, Barrick Gold, 2005. A review the company's 2004 submittal to the Dow Jones Sustainability Group Indexes (DJSI) and recommendations for improvement were provided to the

client. Janice authored suggestions for ways to improve Barrick's response based on our understanding of the purpose of the DJSI and the expectations of the socially responsible investment (SRI) community.

Review of SEC requirements for U.S. listed companies, Nam Tai Corporation, 2005. Reviewed current and possible upcoming environmental, health and safety (EHS) requirements for companies, both foreign and US based, that are listed on US stock exchanges. Janice provided an analysis of the pressures by the Socially Responsible Investment community for mandated and voluntary corporate disclosure of EHS performance.

Background Report for Proposed Partnership between the World Wildlife Fund and an Anonymous Chemicals Company, 2005. Analyzed chemicals company's performance in the areas of air, water and waste sustainability by assessing its own indicators and benchmarking its performance against that of two other chemicals companies. Provided comments on the risks faced by both WWF and the company.

Benchmarking Analysis of Airlines Industry, Innovest, 2005. Janice benchmarked the top 12 large-cap airlines globally in terms of their environmental and social performance. As part of the research, Janice viewed company literature and third party sources, and obtained data from airline EHS staff. Provided scores on over a 100 indicators for each company and analyzed each company's performance relative to the others in the competitive set.

Research on Applicability of Energy Star programs for Real Estate Investment Trusts (REITs), Innovest, 2004. Janice performed market research on the applicability of Energy Star's building energy management program to the operations of major U.S. focused REITs on behalf of the EPA and identified REITs that the EPA could target for this initiative.

Environmental Impact Assessments

Socio-economic Impact Assessment, Northeast Gateway, 2005-2006. This project assessed the social and economic impacts for a proposed off-shore LNG facility in Massachusetts Bay. The assessment analyzed the broad impact of the project on local marine economies, such as the commercial fishing industry and tourism. Janice also analyzed the specific economic impact of the

project on the fish catch in the immediate vicinity of the LNG facility.

Feasibility Study, Environmental Assessment, Air National Guard Toledo OH, 2006. This EA involved various construction projects for an Air National Guard installation. Janice wrote the EA sections on socioeconomic impacts, land use, visual resources and traffic and circulation.

Feasibility Study, Environmental Assessment, Buffalo Main St. Multi-model access and Revitalization Project, 2006. Janice analyzed traffic and public transport ridership information for its impact on the reintroduction of vehicular traffic to Buffalo's pedestrian mall.

Sustainable Development

Model for measuring benefits of water interventions, Water Aid, 2005. Janice helped to author a model that allows the client to evaluate the economics costs and social and public health benefits derived from drinking water development projects.

Pre-Feasibility Scoping Study for Mini-Infrastructure Apex Program, Public-Private Infrastructure Advisory Facility (PPIAF), 2005. The main objective of this study is was to assess the need to establish a new program to help address financial and non-financial barriers limiting the expansion of small-scale water and energy infrastructure providers in least developed and low-income countries, specifically in Africa and Asia. Janice interviewed key experts and provided country-based findings for the need for a program such as MIAP and case studies for inclusion in the final report.

Benchmarking of Water and Sanitation in Poverty Reduction Strategy Papers (PRSP), Water & Sanitation Program, 2005. This benchmarking survey of water and sanitation sector (WSS) analyzed the PRSPs of 12 Sub-Saharan African countries in terms of their approach to the meeting the sector's Millennium Development Goals and improving sector strategy, finance and monitoring and evaluation. Janice helped develop benchmarking indicators in the areas of poverty focus, sector finance, sector reform and monitoring and evaluation. Janice also performed the benchmarking and additional analysis of these factors.

Valuation Report on Millennium Development Goal

for Water and Sanitation, UK DFID, 2005. Analyzed the performance of 12 countries in meeting the MDG goal for sanitation using a cost benefit analysis. Met with World Bank, UNICEF, USAID, and other experts in the sanitation field. Performed sensitivity analyses as part of a cost benefit analysis of global sanitation. Co-authored the report summarizing findings from the cost benefit analysis and interviews. Report was submitted to UK Secretary of State for International Development Hilary Benn, who approved a substantial increase in DFID's budget in water and sanitation.

Diagnostic Test for National Sustainable Development Indicators, UN Division of Sustainable Development, 2003. The aim of the project was to develop an experimental diagnostic test to assess a country's potential and opportunities for sustainable development initiatives using the national sustainable development indicators developed by UNDESA. The test was to be implemented in Barbados using a multi-stakeholder approach. Janice authored and edited sections of the report outlining the diagnostic test as well as provided input on the development of the test itself.

Paper and Cost Benefit Analysis Model for Ecological Sanitation (Ecosan) Projects, UNICEF, 2004. Janice was commissioned by the Water, Environment, and Sanitation Section to undertake desk-based research on Ecosan technology and projects worldwide and create a cost benefit analysis model that could be applied to pilot projects. Janice conducted field visits to sanitation projects in India to assess the sustainability of each project. Janice gave a debriefing presentation in New Delhi to UNICEF, and DFID Environment Advisers. Janice also authored suggestions for expanding UNICEF's global sanitation strategy to promote ecological sanitation at the country level.

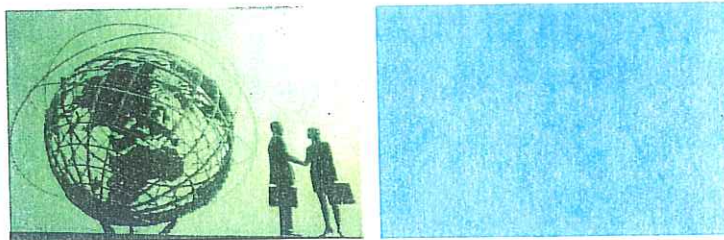
Other Projects and Work Experience

Project Coordination, BP Vietnam and BP Latin America & Caribbean, 2005
Janice coordinated the review of regulatory and legal demands on the client in the countries of Vietnam, Trinidad and Tobago, Colombia and Brazil.

Health and Safety Standard Operating Procedures, Boston Scientific, 2005. Janice authored health and safety SOPs for formaldehyde and methylene chloride for use in a medical products manufacturing facility.

Jason Willey

Ecologist, Wetland Resource Planner



Mr. Jason Willey has seven years' experience in wildlife ecology and natural resource assessment. He specializes in aquatic and fisheries ecology, and wetland biology. Jason also has experience in terrestrial natural resource assessment. Jason's relevant projects include the Anne Arundel County Greenways Master Plan, the Aberdeen Proving Ground Carrying Capacity Study, the Maryland National Capital Parks and Planning Commissions Riparian Buffer Assessment, and the Biological Stream Survey for the Virginia Department of Game and Inland Fisheries.

Fields of Competence

- Wetland Reconnaissance/Delineation
- Riparian Habitat Evaluation
- In-stream macrohabitat assessment (Rosgen protocol)
- Macrohabitat analysis using Habitat Suitability Indices (HSIs)
- Aerial photograph, landscape feature, and habitat interpretation
- NEPA Consultation
- Aquatic ecology

Credentials

- B.S., Biology, University of Richmond, May 1997

Languages

- Some familiarity with Spanish

Key Projects

Anne Arundel County Greenways Master Plan, MD – Lead ecologist on project to design a greenways network for the County. Developed selection criteria for greenway hubs and corridors based on habitat needs of sensitive resident species in Anne Arundel County. Developed greenway network to incorporate natural resources protected under other state and local ordinances, such as the Chesapeake Bay Critical Area. Incorporated HSI models for each species into the Master Plan and analyzed the potential effects of the planned greenway network on problem, rare, and transient species. Evaluated existing and potential protective measures that could contribute to the preservation of the greenway network. Authored a case study that quantified habitat values within a segment of the proposed greenway, recommended land management improvements to increase habitat values, and illustrated the nexus between the proposed greenway network and other planning efforts already completed for the study area.

Caroline County, MD – Co-authored the Land Preservation, Parks, and Recreation Plan for Caroline County, MD. Updated the County's recreation and natural resources inventories. Evaluated the performance of the County's recreation, agriculture preservation, and natural resources conservation programs against statewide benchmarks. Made recommendations to the County to enhance recreation and land preservation programs to provide more high-quality recreation opportunities to its residents, and preserve the agricultural character of Caroline County.

U.S. Army Corps of Engineers – Ecologist on a carrying capacity study at Aberdeen Proving Grounds (APG) in Aberdeen, MD. Collected data from infrared orthophotographs and in field on macrohabitat types, structural diversity of individual macrohabitats, and vegetative biodiversity in field, shrub, and wetland areas. Analyzed relative habitat quality using HSI methodology. Made recommendations on how to maximize use of habitat by fauna at the installation through active management of habitat. Assisted in the

development of an automated analytical tool that determines potential impacts of changes in land use at APG on sensitive species.

City of Buffalo, NY – Consulted with NYSDEC and USFWS regarding the potential impacts of redevelopment of a 6,600 ft streetscape in downtown Buffalo on peregrine falcons.

Multiple clients – Wetland reconnaissances at sites on the Delmarva Peninsula and throughout Maryland. Sites included utility right-of-ways, prior converted cropland, urban brownfields, and undeveloped forested wetlands.

University of Maryland, MD – Inventoried ecological features in wetland, upland, and riparian zones including vegetation cover and soil composition for a proposed redevelopment project on campus. Defined study area during preliminary map work and in field. Assisted with formal wetland and forest stand delineation on site. Submitted report to the University describing wetland and forest resources on site and requirements under the Maryland Forest Conservation Program for conservation of these resources.

Virginia Department of Game and Inland Fisheries, VA – Conducted statewide stream biological survey in wetlands and 1st – 6th order streams as part of a statewide aquatic biological inventory project. Evaluated instream habitats at over 70 sites using Rosgen protocol. Managed project to collate historical aquatic collection records. Directed sampling efforts according to information needs relative to historical data, potential threats to watershed health, and declines in water quality owing to pressures from development and logging operations.

Maryland National Capital Parks and Planning Commission, MD – Described in-stream habitat quality, age class and species composition of riparian forest communities and wetlands at 50 sites throughout Montgomery County, MD. Analyzed data collected in field in order to link water quality to the relative integrity of forested riparian buffers.

Key Projects

Maryland Department of Natural Resources, MD –

Managed a project to determine the physical and social carrying capacity for boating traffic on Deep Creek Lake. Coordinated with the Department of Natural Resources and the Deep Creek Lake Policy Review Board to develop and administer contact and mail-back surveys to collect specific information on resident and visitor use patterns and preferences on the lake. Determined the carrying capacity of the lake for recreational boating use based on trends in historical use and residential development patterns in the region. Determined trends in commercial use of the lake, and the potential for the area surrounding the lake to accommodate future commercial growth. Made recommendations to the DNR and PRB concerning management of increased commercial and recreational use of the lake in the future.

Lakeshore, MD: Small Area Open Space and Recreation Plan–

Lead ecologist on project to refine the existing Greenways Master Plan for Anne Arundel County, MD (see above), to develop specific recommendations for implementing the greenways network, and to develop a recreation and open space plan for the Lakeshore area in northern Anne Arundel County. Designed an open space plan that complemented existing and planned greenways by protecting sensitive natural areas such as bogs and mature forest while steering active recreation into more appropriate areas. Recommended opportunities to implement and expand a planned bicycle/pedestrian network and facilitated meetings with County agencies and the citizen advisory committee to develop the conceptual framework for the open space and recreation component of the Master Plan.

Odenton Town Center, Anne Arundel County, MD –

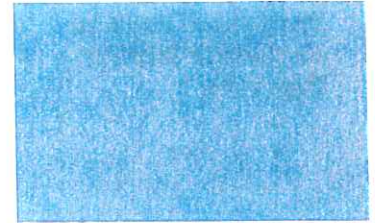
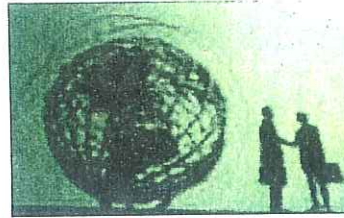
Conducted search for wetland mitigation sites as part of the permitting process for development of Odenton Town Center. Prioritized potential mitigation sites accounting for topography, hydrology, geology and actual/projected land use. Served as liaison between landowners, planners, and regulators throughout mitigation site search.

Crown Landing LLC, NJ – Prepared a comprehensive report on estuarine ecology and fisheries at a 175-acre site in southern New Jersey in support of an application to the Federal Energy Regulatory Commission (FERC) for a Liquefied Natural Gas terminal in southern New Jersey. Assessed the abundance of ecologically and commercially important fauna, including anadromous and resident fish species, the federally threatened shortnose sturgeon (*Acipenser brevirostrum*), state listed Atlantic sturgeon (*Acipenser oxyrinchus*), several fish species of interstate commercial importance, and benthic macroinvertebrates. Participated in Section 7 consultation with NMFS and USFWS regarding impacts to sturgeon, and supervised a multi-year study of the juvenile sturgeon in the lower Delaware River. Assessed the potential for ballast water withdrawals at the proposed terminal to entrain ichthyoplankton at proposed terminal and the potential for commercial development along the Delaware River shoreline to affect the aquatic environment and biota in the vicinity of the proposed project.

Exxon Mobil, TX – Prepared the fisheries section of a report on the biological resources of concern to support a license application to FERC for an LNG terminal on Sabine Pass in Texas. Assessed Essential Fish Habitat, and evaluated the potential for the project to affect over 10 species of commercially and recreationally important shellfish and finfish species. Consulted with NMFS staff regarding the potential ichthyoplankton losses that could result from the use of Open Rack Vaporizers (ORVs) at the proposed terminal, and coordinated an effort to model the near-field and far-field effects of entrainment on sensitive ichthyoplankton.

M. Kenneth Burris, Jr.

Senior Consultant – Water/Wastewater
North America Water/Wastewater Practice Lead



Over 30 years of engineering experience, for a wide range of water related projects including developing engineering, conceptual designs and specifications, and providing technical/engineering support of scientists and engineers for water purification and wastewater treatment systems.

Mr. Burris is experienced in a wide range of water system design, operation, calibration and maintenance for water purification and wastewater systems used in the semiconductor, pharmaceutical, power, oil & refinery and general industry. Technical capabilities include preliminary conceptual study, detailed design, project oversight, startup/commissioning, chemical treatment technologies, analytical monitoring, instrumentation/ control, and operations/maintenance. Types of water systems include ultrapure water, WFI, process cooling, cooling tower makeup, boiler makeup, wastewater, and other facility water systems. Specifically skilled in technical and engineering review of water treatment, chemical treatment, instrumentation and control, recycle/reuse, and wastewater treatment systems for optimization and efficient operations.

Mr. Burris has experience in water purification for drinking water system. He had conducted reviews of system operations and maintenance. He has assisted with federal, state, and local regulatory compliance.

Mr. Burris' experience also includes field extensive technical support services for fossil and nuclear power plants. He has conducted semi-annual technical and engineering review of water treatment, chemical treatment, instrumentation and control system, and wastewater treatment for power plants.

Mr. Burris has been assigned as Water/Wastewater Practice Lead for ERM North America. His responsibilities are to work with the ERM offices and Operating Companies to develop and grow the water/wastewater practice.

Fields of Competence

- Project management of simple to complex water purification and wastewater treatment systems.
- Water purification and wastewater treatment experience including conceptual designs and specifications for semiconductor, pharmaceutical power, oil & refinery and other industry clients using ion exchange, reverse osmosis, ultrafiltration and other treatment technology systems.
- Water system design, operation, calibration, and maintenance for water purification and wastewater systems
- Development of laboratory practices, process chemistry and instrumentation/control systems
- Development of compliance plans for federal, state, and local regulatory agencies

Registrations

- Member of Pennsylvania Department of Environmental Protection, Chesapeake Bay Advisory Committee
- Member of National Ground Water Association (NGWA)
- Member of Water Environment Federation (WEF)
- Member of Electric Power Generation Association (EPGA), Water Quality Sub-committee
- Member of International Society of Pharmaceutical Engineering (ISPE)

Credentials

- B.S., University of North Alabama, 1976

Key Projects

- Provided project management, technical and engineering support for an Alabama industrial manufacturer for design/build project (\$1.2M) of a specialized wastewater treatment system (75 gpm).
- Provided technical and engineering support for a Virginia consumer products manufacturer for evaluation of options for disposal of concentrated wastes. The evaluation included evaporation/solids waste disposal, land application, and animal feed nutrient supplement.
- Provided technical and engineering support for a New York industrial materials manufacturer for evaluation and treatability of a boiler scrubber blow-down wastewater. The evaluation was focused on the treatment and removal of mercury, arsenic and selenium from the wastewater stream.
- Provided technical support for evaluation of treatment technologies for removal of metals from groundwater at a remediation site in New Jersey. Project included an extensive pilot test of electrocoagulation.
- Provided technical and engineering support for the evaluation of a wastewater treatment system at a paper products manufacturer in Connecticut. Project involved issues with regulatory compliance.
- Provided technical support for evaluation of treatment technologies for removal of metals from groundwater at a remediation site in North Carolina.
- Provided project management, technical and engineering support for a Pennsylvania pharmaceutical materials manufacturer for evaluation and resolution of issues with process wastewater containment, collection, and treatment.
- Provided project management, technical and engineering support for a Virginia consumer products manufacturer to evaluate and resolve issues with wastewater discharge to the local POTW wastewater treatment facility. Developed a long-term study to evaluate the effects of elevated BOD/COD and temperature in the industrial wastewater discharge to the POTW.
- Provided technical and engineering support for a New Jersey pharmaceutical manufacturer with the evaluation and development of a facility water conservation plan. Identified water conservation and wastewater reuse strategy to reduce the facility water consumption by 25%.
- Provided technical and engineering support for a university in Delaware with review of the feedwater, boiler water, steam and condensate system for the central steam production facility. The review included chemical treatment programs, monitoring and analysis of water and steam, and operational procedures for operations and maintenance.
- Provided project management, technical and engineering support for a multi-national manufacturer acquiring a manufacturing facility in Nanjing China. An evaluation of the China facility wastewater collection and treatment system and air emission control system was conducted. Concepts and cost estimates were developed for modification or enhancement of the facility environmental systems to meet China Environmental Discharge Standards.
- Provided project management and technical support for inspection of a Pennsylvania pharmaceutical manufacturer's wastewater sewer system. The system was inspected using video cameras to document. A report was developed outlines the findings of the inspection and recommendations. The inspection is a corporate requirement for a 5-year inspection interval.
- Provided technical and engineering support for the evaluation of scaling problem in a groundwater remediation site for a manufacturer in Germany. Provided concepts for potential resolution.
- Provided technical and engineering support for the evaluation of a power generation facility in Rhode Island for compliance with 316(b). Concepts and cost estimates were developed for modifications of the facility.
- Provided technical assistance for evaluation of world-wide oil & gas products manufacturer's business unit environmental compliance reporting requirements. Conducted peer review of guidelines for wastewater discharge and water consumption.

- Provided technical and engineering support for conceptual design of a 26 MGD industrial/municipal wastewater treatment plant located in Tianjin China. Conducted on-site preliminary survey of key industrial manufacturing facilities wastewater treatment capabilities and effluent quality. Develop recommendations for modification of the conceptual design and development of an industrial wastewater management plan.
- Provided technical and engineering support for the evaluation of treatment of Pennsylvania site remediation project with contaminated groundwater for specific metals and organics. Concepts and cost estimates for the potential resolution were developed.
- Provided technical and expert testimony support for legal case involving quality of bottled water. Supported a bottled water distributors claims against bottled water manufacturer.
- Provided technical and project management support for evaluation of powered resin ion exchange condensate polishing system for Michigan power generation facility. Evaluation was to improve performance, effluent quality, and operations.
- Provided technical and project management support for assisting Missouri building materials manufacturer response to revised TMDL requirements (pH). Drafted the technical response to the state regulatory agency.
- Provided technical and engineering support for the Security Vulnerability Assessment of 116 municipal drinking water facilities in Puerto Rico. Involved with the benchmarking of initial representative sites. Participated in the training of field teams to conduct data and information collection. Involved with the analysis and final compilation of data and information into final vulnerability assessment report. Assisted with the submission of final report to the EPA.
- Provided project management, technical and engineering support for the conceptual design and cost estimates of a wastewater treatment facility for a Pennsylvania oil refinery. The facility would treat wastewater for discharge to local river. The cost estimates included capital and O&M costs.
- Provided technical and engineering support for development and execution of a MACT enhanced biological treatment determination and wastewater performance test for New Jersey pharmaceutical chemical manufacturer. The performance test was conducted in accordance with 40 CFR 63.1256 & 40 CFR 63.1257.
- Provided project management and technical support for evaluation of Kentucky chemical manufacturer's wastewater treatment system for removal of soluble and partially soluble HAPs, using WATER9 modeling tool. Additional guidance was provided for compliance with HON MACT.
- Provided technical and engineering support for evaluation of the dramatic failure of a water tank in a Pennsylvania manufacturer's wastewater treatment system. Evaluation included interpretation of laboratory analysis of wastewater and deposits. Participated in Safety HazOp Review of the event. Provided technical and engineering support for repair and replacement of components to return wastewater treatment system to service operation.
- Provided project management, technical and engineering support for technical review of a New Jersey pharmaceutical company's wastewater treatment systems. The site has three separate wastewater treatment systems, which must be upgraded for increased capacity and efficiency. The technical review included conceptual design and cost estimates. The conceptual cost estimates were approximately \$4M.
- Provided technical and engineering support for development of a MACT wastewater performance test for a California pharmaceutical manufacturing company. The performance test was conducted in accordance with 40 CFR 63.1256 & 40 CFR 63.1257.
- Provided technical and engineering support for system to neutralize potassium permanganate. The potassium permanganate was injected into groundwater source to react with VOCs. Activated carbon was used to neutralize the residual

potassium permanganate and remove the color from the groundwater.

- Provided technical support for a wastewater treatment system at a guide dog training center, located in Oregon. The WTP received and processed animal excrement wastes. The principle problem was the nitrification portion of the system.
- Provided project management, technical and engineering support for pharmaceutical company's corporate water conservation program review. The review of the company's existing program encompassed conceptual and technical recommendations for improvement of program goals and objectives. A water conservations 'standard design guide' for new facilities was also outlined.
- Provided project management, technical and engineering support for a review of air, water, and waste permits required for a proposed oil refinery wastewater treatment plant. State and federal permit requirements were examined, after discussion with the applicable regulatory agencies. The review included cost and time required for each permit.
- Provided project management, technical and engineering support for a review of standard operating procedures (SOP) for a pharmaceutical 1,200 gpm high purity water production facility. The SOPs were reviewed and a list of required revisions was compiled.
- Provided project management, technical support, and engineering for specialty metals manufacturer wastewater recycle/reclaim study in Pennsylvania. The project included developing a water balance and determining areas for reuse of wastewater streams. Conceptual designs for equipment configurations and capital/O&M cost estimates were developed.
- Provided technical/engineering assistance for three (3) power generation projects to utilize Acid Mine Water for cooling tower and boiler water makeup. The total water requirements will exceed 21,000 gpm for the three projects. Developing the preliminary technical and engineering information to evaluate the water source. Interface with federal and state regulatory agencies to insure compliance with applicable regulations.
- Provided technical/engineering assistance, project management, and post-design/construction support for \$26M water production facility to support a cogeneration facility for pharmaceutical company. System included reverse osmosis, ion exchange, filtration, condensate polishing, etc. Entire building and facility was designed using 3-D modeling (PDMS). Provided project management of architectural, structural, mechanical, electrical, process, and control disciplines for design and construction support.
- Provided project management, technical support, and engineering pharmaceutical company central utility wastewater recycle/reclaim study in Pennsylvania. The project included developing a water balance and determining areas for reuse of wastewater streams within the central utility system. Conceptual designs for equipment configurations and capital/O&M cost estimates were developed.
- Provided project management, technical support, and engineering for power generation company Laboratory QA/QC Program development in Pennsylvania. The project included development of the Laboratory QA/QC Program and audit of company's power plants for compliance with state regulatory requirements.
- Provided technical/engineering assistance with the evaluation of the existing USP high purity water system capacity for an east coast biotech firm in Pennsylvania; evaluated the requirements of the new process and provided a design for modification of the water system.
- Provided technical support for study of source(s) and extent of copper contamination in wastewater discharges for a copper tubing manufacturer in Pennsylvania; client was under consent decree to resolve non-compliance condition; provided technical support for interpretation of analytical reports; assisted in the identification of contamination sources.
- Provided project manager duties and technical coordination (mechanical, electrical & structural); interfacing with client and coordinating technical

completion of work; provided technical support for startup of condensate polishing system and condensate collection system for a pharmaceutical manufacturer in New Jersey.

- Provided technical/engineering evaluation of the high purity water requirements for the new process area for a medical device manufacturer in Indiana; proposed the use of existing reverse osmosis units and reconfiguration of facilities existing water systems.
- Provided project management, technical support, and engineering with the evaluation of a bldg DI cooling water system distribution piping system for a semiconductor manufacturer in New York; examined the hydraulic design and operational problems encountered; proposed a solution which involved the redesign of the piping network and valve configuration.
- Provided project management, technical support, and engineering for study of facility utility systems for pharmaceutical pilot plant operations in Pennsylvania. The study focused on the reliability and maintenance of the system to support proposed operations for the next 3/5 years. Included electrical, process engineering.
- Provided project management, technical support, and engineering for the conceptual design of USP water system distribution loop to include a new building for a pharmaceutical company in Pennsylvania; evaluated the existing makeup water system to insure sufficient capacity was available; evaluated several distribution piping designs for a set of defined factors.
- Provided technical support for the identification and evaluation of a water resources (>12 billion gallons per day) for a 1,200 mw power plant in Pennsylvania. The water was located in two separate inactive underground mine pools. Support included negotiation for the rights to the water, set-up of program to evaluate and confirm available quantity and quality of water, interface with state and local regulatory agencies for extraction and use of the water.
- Provided project management, technical support, and engineering for study of USP system upgrades for pharmaceutical facility in Pennsylvania. With expansion of the facility, expansion of the high purity water system was required. The study focused on options to accommodate the expansion, including capital/operational cost estimates.
- Provided project management, technical support, and engineering for system upgrades for semiconductor facility in New York. The systems included chemical handling, water/wastewater piping/transfer, and vacuum degasifier. The systems were upgraded with improved with components and controls for improved operations and maintenance.
- Provided technical/engineering support for the identification and qualification of adequate water resources (7,000 gpm) for 600 MW power plant to be located in West Virginia; developed a technical approach for the determination of the quality, quantity and sustainability of waters from underground acid mine; supervised an academic team from West Virginia University in compiling available geological and analytical data on the AMD waters in N. West Virginia and SW. Pennsylvania; developed the conceptual plans for collecting AMD waters from various mines for treatment and transfer to power plant; developed the conceptual plans for the AMD water treatment facility, incorporating iron precipitation, lime softening, and reverse osmosis. Interfaced with federal and state regulatory agencies to insure compliance with applicable regulatory requirements.
- Provided project management, technical support, and engineering for pharmaceutical R&D USP-24 water system in Delaware. The project included evaluation of the system's configuration, with recommendations and cost estimates for improvement of quality and reliability. The project further involved the detailed design engineering for the USP water system.
- Provided project management and technical support, and engineering assistance for evaluation of cation/anion ion exchange system with reduce gallonage throughput for the co-generation facility for a pharmaceutical manufacturer in Pennsylvania; examined existing operations and water source chemistry analyses; throughputs found to be reasonable; provided potential solutions for the

reduction of influent TDS and increased gallonage throughput; developed conceptual design for reverse osmosis system to extend throughput from 400,000 gallons to ~50,000,000 gallons.

- Provided technical assistance with the evaluation of major pharmaceutical manufacturing facility WFI, purified, and process water systems for compliance with USP standards and company defined minimum standards and specifications.
- Provided technical assistance for the resolution of a bio-growth problem in an ambient WFI water system at a pharmaceutical manufacturing facility in Pennsylvania. The piping configuration and operational procedures were also reviewed.
- Provided technical/engineering assistance for the feasibility of recycling wastewater streams from a specialty metal processing facility in Pennsylvania. The collected streams will be re-purified to high purity water quality for reuse within the process. Technical options and process flow diagrams were developed for several collection and treatment schemes. Budget costs were developed for each system option.
- Provided technical/engineering assistance in the investigation and definition of water resources (8-10 mgd) for a proposed power generation facility in Pennsylvania. Involved the examination of potential sources of water, including conventional wastewater and acid mine water. Identified two potential sources for the client's facility, using USGS mapping, GIS, and site/area investigation. Assisted client in qualifying the long-term viability of the sources. Aided in the negotiation for acquisition of the rights to use the sources. Assisted with the interface with federal and state regulatory agencies.
- Provided technical/engineering assistance and project management in the replacement of acid and caustic feed system for delivery of concentrated acid and caustic to Reverse Osmosis and cooling tower systems for a New York semiconductor facility.
- Provided technical/engineering assistance and project management for the repair of wastewater trench system protective coating and installation of a primary wastewater collection piping system at a New York semiconductor facility.
- Developed, installed, and provided technical support for several advanced instrumentation & controls/SCADA systems for government and private industry clients water/wastewater treatment Systems. Systems utilized "man-machine interfaces" for supervisory control and data acquisition. Coordinated the design and installation of a SCADA system for a Russian water treatment facility.
- Developed and provided process monitoring strategies for various industrial and municipal projects. The strategies included process monitoring (flow, level, quality, etc.) utilizing online instrumentation and off-line grab sample analysis programs.
- Provided technical/engineering assistance for the evaluation and strategic planning of water treatment and distribution for various municipal clients, including the elements of industrial development commitments.
- Developed a program for the evaluation of water quality and water treatment for programs in Turkmenistan, Kazakstan and Uzbekistan. Coordinated the development of a program to improve laboratories in selected regions to monitor water quality. Evaluated the operation and maintenance programs for water treatment facilities and pumping transfer stations in the subject countries.
- Developed and conducted a program to evaluate the water disinfecting practices for municipal water treatment Systems in Novokuznesk, Russia. Contributed to the development of improved water quality standards which approached World Health Standards.
- Developed laboratory services for the analysis of ion exchange resin and membrane media (reverse osmosis, ultrafiltration, etc.).
- Developed a 15-year master water plan for Sharjah Emirate (UAE), incorporating existing production and future production requirements to meet projected population growth and industrial development.

Patrick Hendrix

Mr. Pat Hendrix has more than six years of experience in cultural resource management. He began his career at Brockington and Associates, in Mt. Pleasant, South Carolina, as an archaeological field technician and eventually became the office historian. Over the past two years, Mr. Hendrix has worked as a Section 106 consultant for private developers throughout the Southeast while completing a book on the archaeological history of the South Carolina Lowcountry. Mr. Hendrix specializes in cultural resources in the Southeast.

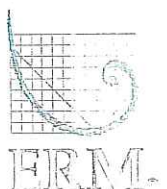
Mr. Hendrix has worked as a project manager writing cultural resources reports according to State and Federal guidelines, and in support of federal licensing. As a cultural resource specialist, he has conducted cultural resources surveys, testing and data recovery projects for government and private clients in the states of Alabama, Arizona, Arkansas, Georgia, Florida, North Carolina, South Carolina, and Virginia. As a professional historian, Mr. Hendrix performed architectural, historical and documentary research and analysis for environmental research. He also conducted studies before a purchase option was exercised to determine if a site had environmental or archaeological concerns that could affect the completion of a development before federal licensing permits were issued.

Fields of Competence

- Phase I Archaeological Survey
- Phase II Evaluative Archaeological Testing for historic and prehistoric archaeological sites
- Phase III Mitigation for impacts to historic and prehistoric archaeological sites
- Historic documentary research
- Historic structure architectural survey
- Development of research and fieldwork designs for cultural resources compliance projects
- Compliance with federal and state cultural resource regulations, including National Historic Preservation Act, National Environmental Policy Act, and Native American Graves Protection and Repatriation Act.
- Predictive modeling for likelihood of archaeological sites in specific locations
- National Register of Historic Places eligibility evaluation for historic structures
- Development of Memoranda of Agreement
- Environmental Assessments in compliance with the National Environmental Protection Act
- Cultural resources portions of Environmental Impact Statements
- Phase I Environmental Assessment Audits
- Communication, verbal and writing skills for both mid level and senior management audiences

Education

- M.A., American History, focusing on Colonial America and African American History, Winthrop University
- B.A., History, Coastal Carolina University, 1985

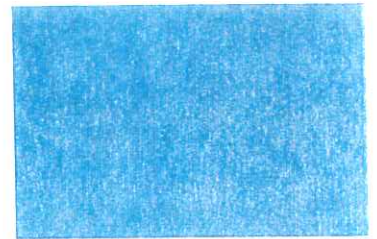


Key Projects

Managed and performed over 300 cultural resource investigations for government and private clients. Conducted extensive record reviews of facilities to determine site history and identify potential environmental and archaeological concerns. Reviewed aerial photographs, plats, historical maps, building permits, city directories, chain of title, on-site records, and regulatory documents from federal, state, and local regulatory agencies. Conducted interviews with facility employees.

Project Manager for numerous NEPA reviews of Telecommunications tower sites. Including Phase I ESAs, Cultural and Natural Resources investigations, and negotiations with regulatory agencies.

Steven C. Hess, Ph.D.



Dr. Steven Hess has over 20 years of professional environmental consulting experience. He has conducted and managed large-scale environmental programs and projects for diverse clients, including the pharmaceutical, chemical, transportation, and industrial manufacturing sectors, both domestically and internationally. He has extensive expertise in regulatory compliance, due diligence, contamination assessment and remediation, impact assessment, risk and liability assessment, ecological assessments, and environmental management systems. He is broadly experienced in project management, including the coordination and management of field activities; data management, analysis and interpretation; report preparation and presentation; and regulatory agency negotiations.

Dr. Hess has extensive international experience conducting and/or managing environmental baseline and impact assessments, due diligence/liability, and regulatory compliance assessments in Germany, Italy, Canada, Mexico, Guatemala, Costa Rica, Honduras, Panama, Colombia, Chile, Venezuela, Peru, Ecuador, Brazil, Argentina, Puerto Rico, the Dominican Republic, St. Kitts, Dominica, the U.S. Virgin Islands, the Bahamas, Jamaica, Johnston Atoll, and Nigeria.

Publications/Honors/Awards

- Author and co-author of hundreds of technical reports and several scientific articles for refereed journals.
- Invited speaker, National Marine Fishery Service, 1986; Smithsonian Institution, 1988
- Adjunct Professor, Nova University, Institute of Marine and Coastal Studies
- Instructor, University of Florida Center for Training, Research and Education for Environmental Occupations, 1990-1991.

Fields of Competence

- Environmental management systems/ISO 14001
- Environmental Compliance Auditing
- Remedial planning, cost estimation, and implementation
- Site assessment/investigation
- Environmental risk/liability assessment
- Human health and ecological risk assessments
- Due diligence programs
- Hazardous materials & waste management
- Environmental impact assessments
- Ecological investigations

Education

- B.S., Biology and Chemistry, University of Miami, 1973
- Ph.D., Marine Sciences, University of Miami, 1987

Languages

- English and Spanish (good reading comprehension, moderately conversant)

Key Projects

Senior Technical Consultant for environmental impact assessments and environmental baseline investigations, including biological/ecological, socio-economic and socio-cultural issues, soil and ground water quality, air emissions, wastewater effluents, and regulatory compliance, at 57 airports throughout Argentina.

Senior Scientist for three-year, multi-disciplinary assessment of aquatic (riparian, estuarine, and coastal) and terrestrial ecosystems of the Niger Delta to establish environmental baseline conditions and to identify environmental impacts resulting from petroleum exploration, production, and distribution on behalf of the Nigerian National Petroleum Corporation.

Senior Technical Advisor for Environmental Impact Assessment related to privatization of Jorge Chavez International Airport, Lima, Peru, and the privatization and expansion of the Cordoba International Airport, Cordoba, Argentina.

Project Scientist for aerial surveys and coastal habitat sensitivity mapping in support of marine petroleum spill response in West Africa for the Nigerian National Petroleum Corporation.

Conducted or managed Phase I/II assessments for pharmaceutical manufacturing and/or confectionery facilities in the Dominican Republic, Venezuela, Chile, Peru, Ecuador, and Brazil.

Senior Scientist for long-term monitoring of impacts to mangrove, seagrass, and coral reef communities in response to controlled, experimental releases of crude oil and oil dispersants in the Republic of Panama on behalf of the American Petroleum Institute.

Risk assessment task manager for an ecological risk assessment entailing 33 RCRA Solid Waste Management Units for major jet aircraft, rotary wing, and rocket engine government defense contractor facility located in an area of protected freshwater wetlands and sensitive upland habitats.

Managed comprehensive environmental risk and liability assessments of the 145-acre Eastern Airlines

Maintenance Base, the 80-acre Pan American World Airways Main Base, and the Pan American bulk tank farm located at Miami International Airport. Included transactional and operational auditing, and contamination assessment, remedial design, and remedial costing for petroleum and non-petroleum/hazardous waste sites.

Project Manager for preparation of assessment of Jet-A fuel contamination of soil and ground water at Concourse F, Miami International Airport for the Miami-Dade Aviation Department. The assessment resulted in horizontal and vertical delineation of soil and groundwater impacts, as well as the presence of over 100,000 gallons of free product that originated from damage to the underground fuel hydrant system piping. Owing to the location of the project, ERM completed all soil borings and well installation at night after having coordinated airside gate closures. This project was completed in accordance with the regulatory requirements established by the Miami-Dade County Department of Environmental Resources Management and the Florida Department of Environmental Protection.

Principal-in-Charge for comprehensive estimate of potential assessment and remediation costs and future (15-year projection) environmental management costs associated with the conversion of approximately 1,900 acres of the Homestead Air Force Base to civilian commercial airport.

Principal-in-Charge for comprehensive environmental regulatory compliance auditing program for Miami-Dade Aviation Department to assess the compliance status of approximately 20 Department Maintenance Shops and nearly 200 tenant operations at Miami International Airport. This project was initiated in 1994, at which time ERM was awarded a sole-source contract to develop the overall auditing program, as required by a Consent Order executed by the aviation department and the Florida Department of Environmental Protection. Auditing was conducted from 1994 through 1996. In 1999, ERM was awarded a similar contract to serve as the aviation department's overall tenant auditing program consultant.

Key Projects (Cont'd.)

Conducted or managed over 150 environmental risk/liability assessments, transactional-due diligence audits, and/or compliance audits of commercial properties/industrial facilities in both the United States and overseas. Industrial facility audits have included bulk petroleum storage and distribution facilities, tire and rubber, record and cassette tape, electronic components, capacitors, and footwear manufacturing facilities, automotive parts manufacturing facilities, truck/automobile servicing facilities, and jet engine overhaul and maintenance facilities, seaport solid waste handling facilities, electroplating operations, carbon/graphite products, and foundry operations.

Principal-In-Charge for multiple work tasks for the Metro-Dade County Aviation Department, to include approximately 20 leasehold exit audits; 20 follow-up site inspections; the preparation of a Spill, Control & Counter Measure Plan, a Best Management Practices Plan, a RCRA Preparedness and Prevention Plan, and SARA annual reports; and multiple Phase I/II environmental site assessments.

Project Manager for a focused risk assessment to develop target cleanup levels for lead soil and ground water at Opa Locka Airport, FL, in support of a runway expansion project. Utilizing risk assessment protocols approved by the U.S. EPA, FDEP, and the local county environmental agency, ERM determined that ambient lead levels posed no unacceptable incremental risk and that soil removal and handling could be undertaken without implementing significant precautions of remediation. ERM's risk assessment was approved by all applicable agencies, the client and the U.S. Coast Guard without the need for revisions.

Conducted a risk assessment to assess closure alternatives vs. human health and ecological risks at an NPL lead-acid battery landfill in Florida, as part of a CERCLA Remedial Investigation/Feasibility Study. Landfill closure costs were minimized based on the closure methods supported by the risk calculations. Project Manager for fieldwork and permitting related to the relocation of government-designated Species of Special Concern at two South Florida airports in advance

of demolition and construction by the Miami-Dade Aviation Department.

Principal-in-Charge and Project Manager for the development of environmental, health and safety management systems and preparation for subsequent ISO 14001 certification of the Miami International Airport bulk jet fuel storage facility and fuel hydrant system. Following development and implementation of the EHS Management System, the facility successfully achieved ISO 14001 certification. This was the first airport-related facility certification in the U.S., the first Jet-A fuel facility certification in the U.S., and only the third publicly operated facility certified in the U.S.

Principal-in-charge for various projects related to Community-Right-To-Know/SARA reporting, compliance auditing, and best management practices planning for the Ft. Lauderdale/Hollywood International Airport.

Principal-in-Charge for a completing state and local air permitting, VOC Emissions Inventory, Emissions Reduction Feasibility Assessment, a 10-year Master Plan for Emissions Reductions, and an Emissions Control Design Project for multiple source controls for a major international airport, addressing chiller units, cooling towers, jet fuel storage tanks and piping, underground fuel hydrant system, tanker truck loading racks, emergency generators, parts washers, incinerators, building and runway painting, and numerous other sources.

Risk assessment manager for a risk-based closure of RCRA surface impoundment at a former electroplating facility, and risk assessment manager for the calculation of Site Rehabilitation Levels using FDEP risk assessment guidelines at multiple petroleum-impacted sites.

Project Scientist for assessments of solid waste handling facilities at commercial seaports in Jamaica, the Dominican Republic, and the Bahamas for the International Maritime Organization and the United Nations Environmental Program, in response to new MARPOL regulations for the Caribbean, as part of a survey of 27 seaports.

Key Projects (Cont'd.)

Project Manager for conducting a Contamination Assessment, Remedial Action Plan, remediation system design, installation and operation for soil and groundwater impacts at a maintenance facility operated by a major municipal water and sewer utility in Miami, FL. Remediation included soil removal and thermal treatment, stormwater system removal and decontamination, design and installation of a new stormwater collection and conveyance system, and groundwater pump and treat/air stripping. Groundwater remediation was completed in three years, as projected through remedial engineering design modeling, and overall site restoration was completed on budget.

Principal-in-Charge and Senior Project Manager for the preparation of a Remedial Investigation/Feasibility Study for a former textile/specialty chemicals production site in South Carolina under the State Voluntary Cleanup Program.

Principal-in-Charge and Project Manager for a Phase I/II due diligence and subsequent Supplemental Site Investigation related to arsenic impacts at a previously developed property in Miami Beach, FL. Remedial planning and cost estimating also was undertaken in support of an application for the development of senior citizen housing following site restoration.

Principal-in-Charge and Senior Project Manager for Phase I/Phase II assessments and environmental regulatory compliance audits of eight water treatment chemical production facilities and 12 warehousing and distribution facilities. Related project work entailed the preparation of detailed Product Liability Assessments and compliance audits of the PSM/RMP programs of those facilities utilizing chlorine for production operations.

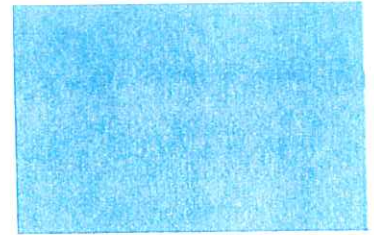
Project Manager for the preparation of Pollution Prevention Plans to reduce the generation of petroleum contact wastewater at the Miami International Airport Jet-A Fuel Facility for submittal to the Florida Department of Environmental Protection.

Principal-in-Charge and Senior Project Manager for a soil and ground water site assessment of a site in South Florida formerly operated a retail gas station and subsequently as a commercial pesticide application company.

Principal-in-Charge and Senior Project Manager for at-sea shipboard environmental compliance and performance audits for a major international cruise line operating out of South Florida and Europe. Audits addressed shipboard management systems, regulatory compliance, and performance with regard to the client's Safety and Quality Management System. The first year audit schedule included 29 ships operating out of ports in the Pacific, Atlantic, Caribbean, Gulf of Mexico, and the Mediterranean.

Sunrita Sarkar

Senior Consultant



Sunrita Sarkar is a post-graduate in Sociology and has been working with ERM India for five years. Prior to joining ERM she was employed in Consulting Engineering Services India Ltd where she gained extensive experience in social assessments, preparation of RAP and entitlement frameworks. Her responsibilities in ERM include project planning, management and execution related to social assessment, social audits, social risks, community participation and natural resources. She has been working on social assessments and resettlement & rehabilitation issues of a number of infrastructure development projects in power, roads and highways, and transmission lines sectors all across the country. She has extensive experience in stakeholder and community management. She has undertaken several poverty and livelihood assessments, as a part of the impact assessments and formulation of RRAPs. She is also a certified SA 8000 Lead auditor.

During her work, she has gained experience in understanding and adhering to international donor agency guidelines on social issues (involuntary resettlement, social assessments, gender and poverty issues etc) and has worked on projects funded by donor agencies such as the World Bank, the International Financial Corporation and the Asian Development Bank). She has extensive exposure to the corporate sector and has carried out several assignments ranging from impact assessments, management of social issues in facility/ plant operations, third party audits, social due diligence and compliance audits on industry and labour standards for Mergers& Acquisitions etc.

In addition to her core expertise, she also has an environmental interface and has been working with the corporate risk team in ERM. Her specific experience includes due diligence assessments & audits (Phase I Environment Site Assessments as per ASTM), EH&S compliance audits and regulatory reviews for a multitude of private sector clients such as GE, Convergys, British Petroleum, Shell, IBM etc

Fields of Competence

- Social Impact Assessments and mitigation
- Developing Resettlement & Rehabilitation Action Plan (RAP)
- Community Relations and stakeholder management
- Monitoring and Evaluation
- Phase I ESA audits & limited compliance review
- Environmental & social regulatory review
- Social Audits
- Policy studies

Education

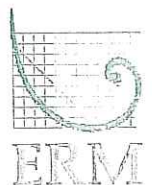
- Masters in Sociology from Jawahar Lal Nehru University, 1997-99
- B.A. (Hons) in History From Delhi University, 1994-97

CERTIFICATION

SA 8000, Lead Auditor

Languages

- English
- Hindi
- Bengali



EMPLOYMENT RECORD

- 1999 August – 2000 July with Consulting Engineers Services (CES), New Delhi
- 2000 August Assistant Consultant with ERM India
- 2003 April till March 2006 Consultant with ERM India
- Currently Senior Consultant with ERM India

RELEVANT PROJECT EXPERIENCE

Social Impact Assessment and Resettlement and Rehabilitation & Formulation of RAPs

- **Social Impact Assessment & formulation of Social Management Plan (SMP) for Unocal's (Chevron) Oil & Gas operations in Bangladesh**
Sunrita is a part of a two member international ERM team that is carrying out the assignment. In this the team is assessing the range of impacts that the 30 year project will have in the host area and tracing the project social footprints and formulating a management plan to mitigate the negative impacts and maximize the positive benefits. The assignment involves close coordination with the corporate group and in depth capacity building and handholding for the Unocal/ Chevron business unit in Bangladesh to actually implement a Social Management Plan. A series of workshops and trainings have been organized to enable the organization for such activities.
- **Social Impact Assessment and preparation of the RAP for Widening & Strengthening (4/6 lane) of Udaipur-Ratanpur-GandhiNagar section of NH8 in Gujarat, World Bank**
In this assignment Sunrita carried out census survey and impact assessment of approximately 3000 project affected persons. The project road had commercial establishments many of which had to be relocated. As a part of the assessment and formulation of the RRAP, the commercial shop owners were consulted and assisted on aspects such as preference of resettlement sites other requirements like transport, infrastructure and continued customer base.

- **Social Impact Assessment and preparation of the RAP for Widening and strengthening of Durgapur Expressway in West Bengal**
Sunrita carried out a census survey and impact assessment of approximately 2000 PAPs who were going to be affected by the widening and strengthening of the expressway. A large number of affected structures were small shops and commercial establishments. In this Sunrita conducted a livelihood assessment as an integral part of the assignment to relocate the shop owners and ensure no loss of livelihood and continued business growth.
- **Social Assessment for the Geometric Corrections on East Coast Road for Tamil Nadu Road Development Corporation & IL &FS 2000 – 01.**
- **Social Assessment of the Madhya Pradesh State Road Infrastructure Project PWD PCC for the PWD as part of the MP Project Co-ordinating Consultancy Services (in consortium with Sverdrup Civil Inc.), 2000 – 2001**
- **Socio-economic Impact Assessment of the Rajasthan Power Sector Restructuring Project, World Bank**
The socio-economic impact study involved providing an integrated and participatory framework for gathering analyzing, prioritizing and incorporating social information in developing and implementing the power reform programme in the state. The state power sector reforms process is being supported by the World Bank. ERM was also asked to develop a social strategy that will influence the decision making in the reform process, help monitor the impacts of the reforms on poor and vulnerable groups and identify steps to mitigate the hardships faced by these groups, if any. The study involved extensive field survey of over 1000 households in rural and urban areas in the entire state, an extensive consultations at the state, district and village levels. 3 stakeholder workshops were held as a part of this consultation process.
- **Social and Environmental Analysis of the 2nd Rural Water Supply and Sanitation Project, Maharashtra for Water Supply and Sanitation Department, Govt. of Maharashtra & World Bank**

ERM conducted a social and environmental analysis, which a part of the project preparation study of the World Bank supported water and sanitation project. The objective of the study is to assist the GOM in designing the project taking into account the socio-economic characteristics of the target population and the environmental issues, so that the project / program delivers sustainable water and sanitation services to rural communities at large and poor and vulnerable groups (such as women, scheduled castes and scheduled tribes), in particular. The analysis was conducted in 20 villages spread over 5 districts covering different geographical locations in the state and more than 600 households. A separate **Indigenous Peoples Development Plan (IPDP)** was also prepared with extensive consultations and participatory PRA and planning activities with tribal communities in Gram Panchayats (local village representative bodies) in seven districts with high tribal concentration.

- Independent Review and finalizing of Resettlement Action Plan for Public Disclosure (Sakhalin, Russian Federation) for Sakhalin Energy Investment Company (SEIC.)
SEIC has been asked by prospective Lenders to prepare a RAP and disclose it for public review. ERM has been asked to independently review the RAP prepared by SEIC as well as the comments provided by the Lenders, identify and close gaps, and highlight potential risks to SEIC. Sunrita was a core member of the team to review and finalise the RAP.
- Resettlement Completion Audit for Lafarge Surma Cement at the project site in Bangladesh, 2004
Lafarge has undertaken construction of a cement plant about 250 km from Dhaka with funds from the International Finance Corporation (IFC). The company has acquired 178 acres of land for different project components like the cement plant, long belt conveyor (LBC), colony, road and community area. A Resettlement Action Plan (RAP) was prepared for the above mentioned project and has been implemented since 1999. ERM was commissioned to undertake a resettlement completion audit with the objective

of assessing resettlement in the context of the objectives of OD 4.30 (Involuntary Resettlement), and determine whether the Resettlement Action Plan (RAP) was implemented in such a way that affected people were not made worse off and, preferably, benefited by the resettlement. Sunrita was one of the two auditors who conducted this assignment.

- Independent Social Review of the Rural Transport Improvement Project in Bangladesh, for the Local Government Engineering Department, Bangladesh. (January 2003 to March 2003)
- Social Assessment of the Ennore Manali Road Project in Tamil Nadu for Tamil Nadu Road Development Company & IL & FS Ltd., 1999 – 2000
Tamil Nadu Road Development Corporation and Infrastructure Leasing & Financial Services (IL & FS), with funding from the *World Bank*, were proposing to broaden a two-lane carriage-way to a four lane toll road to service the port of Chennai. There were about 1600 households that were affected by the road improvement. ERM was assigned the job of conducting social assessment of all the Project Affected Families and accordingly prepare a suitable Rehabilitation Plan for them. The Project Affected Families were largely slum dwellers, commercial shop owners and illegal occupants of government land. The RAP recommended provision of a resettlement site, strategy to ensure that livelihoods are restored as well as mechanisms to improve the quality of life of the PAFs.
- Social Baseline Study for Cairn Energy Ltd. in Rajasthan Oil block, 2004
The assignment included preparation of social baseline, strategic impact assessment of Cairn's operations in the block as well as formulation of stakeholder management strategy based on consultations with various categories of stakeholders. Sunrita was the project manager and was responsible for regular interaction with the client, developing the methodology and preparing the reports.
- Comprehensive Environment, Social and Health Impact Assessment for Hazira Port Private Limited for the Shell Hazira Group, 2003

ERM has been asked by HPPL, a part of Shell India, to undertake a CESHIA for all their project components (multi-cargo port, terminal, pipeline and infrastructure corridor) in Hazira and prepare an implementable impact management action plan. The CESHIA needs to be developed not only under the requirement of MoEF but also as a corporate requirement of the Royal Dutch/Shell Group. The assignment involves extensive field analysis covering 6 villages in and around Hazira and a series of workshops with Shell personnel to develop a practical and mutually acceptable management action plan.

- Regulatory review and Initial Environmental and Social Impact Assessment for a Bauxite Mine in Orissa for a confidential client
An international mining company is studying the feasibility of bauxite mining in Kalahandi district of Orissa. ERM has been invited to undertake a desk-based regulatory review and an initial assessment of social and environmental impacts to identify high risks issues, and advice the company on immediate and long-term strategies for environment and social impact mitigation as well as stakeholder engagement. Sunrita is one of the core members undertaking this assignment
- Social assessment for Allain Duhangan Hydroelectric Project (ADHP) in Himachal Pradesh
RSWML is seeking partial financing from the *International Finance Corporation* (IFC) for the project. To fulfill the requirements of IFC's Environmental and Social Review of the project, ERM India has been invited to prepare detailed information on environmental and social impact assessment of the project, along with seven specialised studies and a reconnaissance survey for the proposed transmission line corridor, prior to IFC's approval on financing the project. ERM prepared a detailed RAP for the project, recommended institutional and monitoring mechanisms and developed a detailed Public Consultation and Disclosure Plan for the entire project period.
- Environmental and Social Assessment for the Technical Assistance for the privatisation of 660

km 400 kV Transmission Line in Madhya Pradesh and Gujarat (funded by Asian Development Bank) for Power Grid Corporation India Limited (in consortium with K&M Engineering & Consulting Corporation, USA), 2000 – 2001

ERM India, in association with K&M Engineering & Consulting Corporation, USA, provided technical assistance for privatisation of a 660 km 400 kV power transmission line in Gujarat and Madhya Pradesh. The technical assistance was funded by the *Asian Development Bank* (ADB) to enable Powergrid Corporation India Limited to privatise part of their operations on a BOO basis. ERM India provided technical assistance towards identifying the anticipated environmental and social impacts of the proposed transmission line project and in preparing the bid documents for international competitive bidding. Sunrita was the project manager and was responsible for client interface, fieldwork, report preparation and quality of deliverables.

- Social Assessment of the Rehabilitation and Upgrading to 4-6 Lane Divided Carriageway for Kishanganj- Bhilwara-Chittorgarh – Udaipur Section of NH 8, NH 79 and NH 7
- Social Impact Assessment and preparation of the RAP for Construction of a Bypass of NH 2 at Panagarh in West Bengal, World Bank

Monitoring and Evaluation

- Monitoring and Evaluation of the Resettlement and Rehabilitation Action Plan for Construction Packages I A, I B, I C and II B of Grand Trunk Road Improvement Project (GTRIP), New Delhi 2002- ongoing
The National Highways Authority of India (NHAI) has been given the mandate for implementation of the National Highways Development programme (NHDP) that includes nearly 421 km of the 900 km long Agra-Dhanbad section of the National Highway-2 (NH-2, which is being strengthened under the Grand Trunk Road Improvement project (GTRIP) funded by a credit from the International Bank for Reconstruction and Development (IBRD). The project proponents intend to have an independent assessment of the implementation of

the R&R Action Plan and its compliance to the World Bank guidelines to enhance its effectiveness and hence reduce the adverse impact on the resettled community. ERM India has been asked by NHAI to conduct monthly and quarterly monitoring of R and R activities as also annual, mid term and end term evaluation.

- Monitoring of the Resettlement and Rehabilitation Action Programme of the Ashram Chowk Flyover Project for Noida Toll Bridge Company Ltd and IL&FS (Infrastructure Leasing and Financial Services Limited), New Delhi. 1999 – 2000
- Techno-economic Feasibility Study of Hyderabad-Vijaywada-Machilipatnam Toll Expressway, World Bank
- Pre Feasibility study of Greater Noida - Mathura Expressway.

Corporate Social Responsibility

- Formulating a Guidance Manual for Management of Business Ethics and corporate sustainability for a major Indian Corporate (confidential client)
Sunrita is the project manager in the two member team that has carried out the assignment. In this she assisted an Indian group of companies in formulating a guidance manual for business ethics. As a part of the assignment the team has reviewed the existing systems, laid down standards and procedures, measures and indicators for issues such as supply chain management, labour welfare, corporate citizenship, environment health safety, sexual harassment and equal opportunities.
- Assessing social performance of major oil and gas companies for a confidential client
In this desk based study, ERM looked at information available in the public domain for three major companies and made an assessment of the corporate commitment to social issues, of their social interventions and investments and the impacts of these interventions. The study also investigated the public image of the companies as reported in the media and as described in their

official websites. This information was supplemented by feedback from strategic interviews with relevant officials to prepare an overview of their social performance.

- Development of RAP and associated risk management for a voluntary resettlement project in Kazakhstan.
ERM was asked by a consortium of oil companies to assess the impacts of voluntary resettlement of 179 families to an urban settlement in Kazakhstan. ERM analyzed the household survey to assess impacts, developed an entitlement framework and a detailed RAP for the project affected families, following the international best practices. The RAP included an implementation plan, institutional arrangements, and a public consultation and disclosure plan. These recommendations were a part of the risk mitigation strategy for the client. Ms Sarkar was a part of an international team working on the project.
- External Assurance services and verification of the Annual Environmental & Social Report 2006 for Cairn Energy Ltd
- Review of external issues and CSR trends in the automobile industry in India for Hyundai

Corporate Risk (Phase I ESA, Due diligence and Social Compliance Audits & Regulatory Reviews)

- Social Compliance Audit (Supply Chain Assessment) of a drug manufacturing facility based in Pondicherry for Johnson & Johnson
- Social due diligence and risk assessment on behalf of an investment company of Hospitals located in Ahmedabad, Vadodra and Hyderabad
- Social due diligence (assessment of social & community risks) for a Joint Venture for a multinational oil & gas company.
- Social due diligence (assessment of social & community risks) for a Joint Venture for a multinational cable manufacturing company.
- Revision and Updating of the India Local Law Guidance for GE India. As a part of the core team

revised, restructured and updated GE India's existing Local Law Guidance ('India Sourcing Guide' and the 'Comparison Checklist with India Guide') to reflect current Indian laws on Environment, Health and Safety.

- Environment Health Safety (EHS) audit of lamp manufacturing facility located in Uttaranchal state
- Phase I Environmental Site Assessment audit of two commercial buildings for a confidential multinational client in Mumbai, January 2004. Conducted two Phase I Environmental Site Assessments (ESA) for a confidential multinational client. The purpose of the ESA was to evaluate potential environmental impacts (based on a review of available documents and field study) associated with the current and past operations at the site.
- Phase I Environmental Site Assessment of a commercial complex (under construction) for a confidential multinational client, Mumbai, December 2003. Conducted Phase I ESA of a commercial complex currently under construction, for a confidential multinational client. The purpose of the ESA was to evaluate potential environmental impacts associated with the current and past operations at the site and their long-term impacts on the complex, its H&S implications and its environmental liabilities.
- EH&S Due Diligence support services related to the proposed divestment of a major Indian Public Sector Oil Company for a Confidential Multinational client, July 2003 – November 2003
- Phase I ESA of a commercial property in Bangalore, December 2003.
- Phase I ESA of a commercial property in Bangalore, January 2004.
- Environmental Screening of two greenfield sites for a Confidential Client, Chandigarh, March 2004. The purpose of the assignment was to identify issues, concerns and potential environmental risks associated with the past or current use(s) of the sites and activities at neighbouring properties, based on visual survey.

- Environmental Screening of two greenfield sites for a Confidential Client, North West Delhi, March 2004. The purpose of the assignment was to identify issues, concerns and potential environmental risks associated with the past or current use(s) of the sites and activities at neighbouring properties, based on visual survey.
- Phase I Environmental Site Assessment (ESA) and Limited Compliance Review of three properties currently under operation for a Confidential Client, Gurgaon, March 2004. The purpose of the assignment was to identify issues, concerns and potential environmental risks and/ or liabilities associated with the past or current use(s) of the sites and activities at neighbouring properties and to ascertain and certify regulatory compliance of the properties.
- Asbestos containing material survey for a multinational in India
- Hazardous waste regulatory review and assessment of TSDF facilities in India for a multinational IT company
- Environmental Regulatory review of current and emerging trends in environment legislation for a confidential client, December 2003.
- Environmental Health Safety regulatory review for British Petroleum's operations in Pakistan
- Asset Retirement Liability Assessment (under Fin-47) for Dana Corporation

Natural Resource Management

- Study on Environment and Poverty Linkages in Partner States: West Bengal, for DFID
- Documentation of Projects on Water & Sanitation in Rajasthan, UNICEF
- Environmental Impact Assessment of Loktak Lake, Client : ICEF
- Concurrent Monitoring of Batch III along with Process Documentation of PMU/DPMU- Swajal Project, World Bank
- Impact Monitoring of the India Eco development Project for the Buxa Tiger Reserves, West Bengal for

the Forest Department of West Bengal & World Bank . 2000

Workshop and Networks

- IDFC – ERM Joint Initiative on Resettlement & Rehabilitation. Ms Sarkar was a core team member for this initiative, which was a joint effort by IDFC and ERM to establish a network of the leading professionals in the country related to R&R issues.
- Workshop on social impact of power sector reforms in the state of Rajasthan. Sunrita was a part of the core team, and was involved in organizing and documenting the proceedings of the zonal and state level workshops.

William C. (Chris) Clark

1 Professional Geologist

Twenty six years of experience with environmental consulting firms, engineering firms, government agencies, heavy and residential construction companies and oilfield geologic companies. Extensive experience evaluating properties for development potential, soil surveys, and ecological profiles. Experience with soils contamination, ground water contamination, and remedial alternatives at a variety of RCRA, CERCLA, and underground storage tank sites. Hydrogeologic responsibilities included design and supervision of drilling programs, design and installation of monitoring well networks, and implementation of ground water sampling programs.

Conducted development feasibility assessments and wetland delineations for hundreds of properties in the Florida panhandle.

Conducted environmental audits at numerous commercial facilities, industrial facilities and undeveloped properties for real estate transactions.

Conducted 1.2 million acre soils/geologic survey with emphasis on field data interpretation and compilation into a GIS layer. Supervised heads up digitization of final product. Field experience included extensive work with all textures of soils, including organic soils. Recognition of geologic parent material through soil pedogenesis to expedite mapping through soil profile prediction.

FIELDS OF COMPETENCE

Field experience included wetland delineation with extensive evaluation of hydric soils, hydrophytic vegetation, and hydrologic connectivity. Determinations of federal versus state jurisdictions and applicability of local, state, and federal land use limitations.

Phase 1 ESA reports and investigations. Contamination extent and concentration determination.

Geologic mapping, data compilation and professional reports.

Development, implementation, and management of hydrogeologic investigations associated with ground water and soils remediation at hazardous waste sites, underground storage tank sites, and non-hazardous waste sites.

Client liaison with regulatory agencies.

EDUCATION

- B.S., Geology, University of Georgia, 1979
- Undergraduate level course work in hydrogeology, University of Georgia, 1978.

CERTIFICATIONS

- State of Florida Professional Geologist #2220
- State of Florida Registered General Contractor #RG0066G23
- HAZWOPER 40 hour Training



KEY PROJECTS

- 1.2 million acre soil survey for a timber company in MS, LA, AK, AL, FL, and SC.
- 1600 acre wetland delineation and Development feasibility Assessment.
- Hundreds of wetland delineations and Development Feasibility Assessments for tracts of less than 1000 acres to 1/4 acre.
- Conducted Phase 1 ESA and compliance assessments for City Dump facility. Conducted site assessment to determine the extent of lead contaminants in soil and ground water.
- Conducted Phase I ESAs for pre purchase due diligence at marina site, health care facility, three contaminated garage sites, potential marina site, restaurant site and abandoned jail facility with onsite USTs.
- Conducted Phase I ESA and compliance evaluation at a ship yard. Conducted site assessment to determine the extent of heavy metals contamination. Directed onsite cleanup and post cleanup sampling and testing.
- Dozens of Phase 1 ESAs for vacant and uncontaminated lands.
- Design of several subdivisions to maximize avoidance of wetlands and associated mitigation.
- Engineering and environmental director of Franklin County, Florida
- Wellsite Geologist for hundreds of wells throughout Southwest and Southeast U.S.
- Construction Inspector for FDOT bridge and roadway projects.
- Construction superintendent of 39 Lot Gated Subdivision with pool, clubhouse & utilities.

ALFREDO J. TORRUELLA, Ph.D.

Physical Oceanographer

SKILLS: Complex systems analysis, geophysical fluid dynamics, statistical mapping of experimental data, beach erosion/wave impact modeling and analysis, artificial reef design, marina design, environmental impact assessment.

EDUCATION:

1995 **Scripps Institution of Oceanography**
Ph.D. in Physical Oceanography; advisor: Dr. Russ Davis.
Dissertation: *"The Fall Upper Ocean Heat Balance in the Northeast Pacific."*

1987 **Dartmouth College**
BA in Physics; cum laude, with citations in Statistical Physics and in Plasma Physics.

WORK HISTORY:

8/02-present **Associate Professor of Physics;** University of Puerto Rico, Bayamon (received tenure 4/2000)

8/95 - 7/02 **Asistant Professor of Physics;** University of Puerto Rico, Bayamon

6/94-present **Co-founder: Caribbean Oceanography Group;** consulting firm specializing in physical oceanography and environmental impact assessment.

9/87 - 3/94 **Research Assistant;** responsible for the analysis of the data from the OCEAN STORMS air-sea interaction experiment. Employer: Dr. Russ Davis, Physical Oceanography Research Department, Scripps Institution of Oceanography, University of California San Diego, San Diego, California.

CONSULTING: **Consultant** for Palmas del Mar Properties, Inc. Modeling of wave fields, wave induced stresses and currents and erosion potential for Punta Candeleró, Humacao, PR, and its surrounding beaches. Design of artificial reef for control of beach erosion and reduction of rip current hazards. (February 2005 - Aug 2005)

Consultant for Stanford Development Company. Currently planning the *North Sound Marine Reserve*. Developed Coastal Zone Management Plan for Maiden Island, Antigua, West Indies, Wave

Refraction/Diffraction, Bathymetric, Hydraulic Stability Analyses. Designed world's largest artificial reef. (March 2002-present)

Consultant for Marina de Ponce, Ponce, P.R. "Coastal Flood Insurance Study for Marina de Ponce." , Wave Setup, Wave Run-up, Wave Height Analysis (WHAFIS), Overtopping Analysis , Wave Forces Analysis, Erosion/Scour Assessment (July 2004).

Consultant for Club Nautico de San Juan. Design of expansion for Club Nautico de San Juan marina, San Juan, Puerto Rico. (January 2004)

Consultant for Empresas Ferrer. Design of expansion for San Juan Bay Marina, San Juan, Puerto Rico. (October 2003)

Consultant for Empresas Ferrer. Wave Refraction/Diffraction, Bathymetric, Hydraulic Stability Analyses and design of expansion for Villa Marina Yacht Harbor, Fajardo, Puerto Rico. (Feb-June 2003)

Consultant for Gutierrez, Latimer & Gutierrez. Conducting Tidal Analysis, Shadow Analysis, Wave Refraction Analysis & Sea-wall and Artificial Reef Design for Princesa del Mar Project. (February 2001)

Consultant for Caribe Playa Resort, Salinas, PR.

"Evaluation of the causes of the beach erosion at the Caribe Playa Resort and Design of breakwater to mitigate the problem."(Dec.1995).

Consultant for Marina de Ponce, Ponce, P.R.

"Environmental Impact Assessment and Breakwater Design for Marina de Ponce." (July 1994).

Expert Witness for the Law Offices of William Estrella. "The Prevalent Oceanographic Conditions and Dynamics Near The Island of Palominos on October 16,1998."(July 2000).

Expert Witness for Mercado & Soto. "Report Concerning the Oceanographic Conditions at the San Juan Harbor on December 31, 1990."(Feb.1996)

RECENT

PUBLICATIONS: *"Global Warming and Mean Sea Level Changes in San Juan, Puerto Rico: Rates, Consequences and Solutions"*, Revista Milenio, Vol. X, 2005-2006 (*in press*) ISSN 1532-8562.

ACADEMIC:

4/2002

Awarded Tenure: Physics Department, University of Puerto Rico, Bayamon.

3 /04 – present

Academic Senator: Physics Department, University of Puerto Rico
Charperson: Academic Affairs Comitee, Academic Senate, UPRB

8/05-present

Masters Thesis Comite Chairperson: "Headland-Bay Beaches in Static and Dynamic Equilibrium on the North Coast of Puerto Rico", by Yazmin Martinez, University of Puerto Rico, Rio Piedras.

8/02 - 12/03

Masters Thesis Comitee Chairman: "The Barometric Efficiency of Observation Wells in Puerto Rico and the U.S. Virgin Islands", by Ronald T. Richards, University of Puerto Rico, December 2003.

8/02-8/03

Member: Institutional Comitee for Revision of Promotion Procedures *Redesigned criteria for promotion within the UPRB*

8/00-8/02

Member: Institutional Personel Committee *Reviewed and evaluated files of personel up for promotions*

8/00- present

Member: Departmental Personel Comitte *Interviews of prospective candidates for hiring, as well as evaluations of present faculty.*

HONORS:

9/26/06

Offered: *Leccion Magistral 2006** at UPR Bayamon Campus. Topic: "Artificial Reefs: the Science Behind The Art". **The opportunity to offer the Leccion Magistral is an honor bestowed to one outstanding candidate per year from any academic-related field.*

4/16/05

Awarded: "Valor Humano del Año 2005" by the Regional Press Association at the XVI Encuentro Empresarial de Puerto Rico y America 2005. *(for the design and construction of world's largest artificial reef located in Antigua, W.I.)*

PERSONAL:

Captain, 1990 California State Taekwondo Team; top ranked welterweight in California for 1990 season; fought for California at the 1990 US National Championships, held in Madison, Wisconsin.

Member, 1985 Puerto Rico Hobie Cat Team; sailed for Puerto Rico at the 1985 Hobie Cat World Championships, held in Isla Verde, Puerto Rico.

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Appendix F

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199 Department of Fisheries. Interview with Michael Brainan, Director, and Edison
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 201 25, 2007

202 Dept. of Physical Planning. 2007. Interview with Michael Major, Director of the
 203 Department of Physical Planning, Nassau, Bahamas, January 24, 2007

204 Dept. of Works. 2007. Interview with Howard Barret, Chief Civil Engineer, Sharon
 205 Griffiths, Sr. Engineer Civil Design and Robert Garvey, Civil Engineer of Department of
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207 McDermott. 2007. Interview with Tom McDermott, Mosko Group, Nassau, Bahamas,
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