ICF Marbek
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Ralph Grismala, P.E. **ICF International**
Technical Director

EDUCATION

M.S., Civil Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, 1978
B.S., Civil Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, 1978

CERTIFICATIONS AND TRAINING

State of Connecticut, Professional Engineer, License No. 15498, since 1988
Groundwater Pollution and Hydrology, The Princeton Course - Cleary, Miller & Pinder
FERC Dam Safety Performance Monitoring Program, Potential Failure Mode Analysis Facilitator
Association of State Dam Safety Officials (ASDSO), Emergency Action Planning for Dam Safety
OSHA Hazardous Waste Operations and Emergency Response (29 CFR 1910.120)

EXPERIENCE OVERVIEW

Mr. Grismala is a geotechnical engineer and a Licensed Professional Engineer with more than 30 years of experience. He has focused on the development and implementation of comprehensive Geotechnical Safety Programs for risk management; and has participated in engineering projects involving earth dams, landslide prediction and control, slope stabilization, ground settlement, land subsidence, soft ground foundations, mine tailing waste, ground water control, secure hazardous waste storage facilities, environmental impact assessment, environmental site assessment and remediation, reservoirs, ground water contaminant monitoring, seepage barriers, aquifer modeling, pipelines, field instrumentation systems, and laboratory testing. Mr. Grismala has managed major projects in North America, South America, Europe, Asia, and Africa for both private and public sector clients.

PROJECT EXPERIENCE

Mines and Mine Tailings

Geotechnical Safety Program for 50 Florida Tailings Dams, IMC Agrico, 1995-2004.
Senior engineer for review of a geotechnical safety program developed and implemented for more than 50 tailings dams scattered throughout a 1,000 square-mile area in central Florida and with a total embankment dam length of over 160 miles. Developed engineering and environmental guidelines for the design and construction of tailings dams built by the mining company, assessed and improved the safety of the processing effluent reservoirs, and evaluated the performance of reclaimed reservoirs at the phosphate mines.

Genna Luas Industrial Waste Repository, Phase II, Ambiente, 2001-2002. Performed a design review for the lining for the expansion of an industrial waste facility from 150,000 m^3 to 650,000 m^3 capacity. Provided onsite construction and QA oversight on behalf of the owner. Provided independent estimate of construction costs for Phase II and future phases.

Elizabeth Mine Superfund Site, US Army Corps of Engineers, 2001-2002. Senior civil engineer responsible for Engineering Evaluation and Cost Analysis (EE/CA) for the remediation of an abandoned copper mine in Strafford, Vermont. The EE/CA evaluated a short list of reasonable clean-up options, including consolidation, capping and containment of tailings heaps; storm water diversion; leachate control and treatment; and the construction of wetlands for long term mitigation. This work led to a remedial solution that satisfies the needs of state and federal regulators, local community stakeholders, and the Army Corps of Engineers.

Genna Luas Industrial Waste Repository, Phase I, Portovesme and Enirisorse, 1999-2001. Performed a design review and developed the construction QA procedures for the conversion of a zinc and lead surface mine into a 1.4 million cubic meter capacity secure industrial waste storage facility in Sardinia, Italy. Provided onsite construction and QA oversight on behalf of the owner.

Tailings Dams, Stauffer Chemical and Rhône-Poulenc 1987-1989. As part of a Geotechnical Safety Program, assessed the stability and flow conditions of the tailings dams for a trona mine in Wyoming.

Coronet, Amax Chemical Co., 1983-1987. Performed flow and stability analyses to assess current conditions for a series of interconnected phosphate mine tailings reservoirs and their dams. Developed a protocol to calculate

heights of wave development and runup to establish freeboard criteria. Designed remedial measures to improve the dams' operational safety. Evaluated instrumentation data to monitor pore pressure development, settlement, and lateral movement in the dams and their foundations. Prepared Safety Assessment reports and established operational guidelines.

Piney Point, Borden Chemical Co. 1981-1982. Performed flow and stability analyses to assess current conditions of phosphate mine tailings dams, and designed remedial measures to improve their operational safety. Evaluated instrumentation data to monitor pore pressure development, settlement, and lateral movement in the dams and their foundations. Prepared Safety Assessment reports and established operational guidelines.

Big Four Dam, Borden Chemical Co., 1978-1982. Designed and installed instrumentation system to monitor pore pressures for stability analyses of the circumferential dam holding phosphate mine tailings. Performed flow analyses and stability analyses to assess the safety of the dam and its foundation. Prepared Safety Assessment reports and established operational guidelines.

Environmental Assessments

Malawi Power Sector Feasibility Study, Millennium Challenge Corporation (MCC), 2010. Environmental specialist responsible for the preparation of multiple environmental impact assessments (EIAs) for proposed electric power system improvements throughout Malawi. The projects include aquatic weed management and sediment removal at three existing hydropower dams along the Shire River, upgrade and refurbishment of the hydroelectric generation facilities, upgrade and expansion of the transmission line network, upgrade and expansion of the distribution system, rehabilitation of existing substations and construction of new substations. The proposed projects involve several hundred individual facilities and more than 1,000 km of transmission and distribution lines. The purpose of the technical, economic, environmental, and social feasibility study is to determine which projects move forward for MCC funding.

Turkey Point Nuclear Reactors EIS, U.S. Nuclear Regulatory Commission (NRC), 2010. Subject matter expert for non-radiological waste and uranium fuel cycle sections of the EIS for the Combined Operating License (COL) application for two new nuclear reactors at an existing power plant site in Florida between Biscayne Bay and the Everglades. Responsibilities included review of the developer's environmental report, formation of information requests, technical meetings with the developer and regulators, public hearings, and writing sections of the EIS.

Tanzania Transport and Water Sector Infrastructure Projects, Millennium Challenge Corporation (MCC), 2008-2010. Lead environmental specialist responsible for the evaluation of environmental studies, monitoring for compliance with environmental management plans (EMPs), and periodic in-country missions to ensure that the implementation of the road and water supply projects meet environmental performance standards and MCC Environmental Guidelines. The projects include upgrading over 450 km of unpaved rural roads to bitumen or asphalt standards, upgrading water treatment plants, and improving water supply distribution networks. Responsibilities included evaluation of Environmental and Social Impact Assessments (ESIAs) prepared by contractors to the Millennium Challenge Account – Tanzania (MCA-T), recommending specific improvements in the impact identification and proposed mitigation, verifying that EMP measures were incorporated in the bid packages, and working closely with counterpart MCC and MCA-T specialists.

Levy County Nuclear Reactors EIS, U.S. Nuclear Regulatory Commission (NRC), 2008-2010. Subject matter expert for non-radiological waste and uranium fuel cycle sections of the EIS for the Combined Operating License (COL) application for two new nuclear reactors at a greenfield site in Florida. Responsibilities included review of the developer's environmental report, formation of information requests, technical meetings with the developer and regulators, public hearings, and writing sections of the EIS.

Supplemental Generic EIS, Horizontal Drilling and Hydraulic Fracturing, NYSERDA, 2009. Technical specialist and author of sections of the supplemental generic EIS for well permit issuance for horizontal drilling and high-volume hydraulic fracturing to develop the Marcellus Shale and other low permeability gas reservoirs in New York State. The sections provided a description of the state-of-the-art practices in hydraulic fracturing, including simulations and modeling, fracture monitoring, use of fracturing fluids and additives, controlling fracture growth, refracturing, and costs. Technical analyses focused on the subsurface mobility of fracturing fluids and additives, especially with regard to potential impacts to groundwater aquifers. The report included a comparison of state regulatory practices.

Strategic Petroleum Reserve Supplemental EIS, U.S. Department of Energy, 2009. Technical lead for issues related to raw water intake from groundwater sources and brine disposal into saline aquifers for the solution mining of 160 million barrel capacity storage caverns in the Richton salt dome in Mississippi.

USEC American Centrifuge Plant EIS, U.S. Nuclear Regulatory Commission (NRC), 2007. Responded to questions related to water withdrawal and subsidence posed by the Atomic Safety and Licensing Board for the EIS for USEC's proposed gas centrifuge uranium enrichment facility in Piketon, Ohio.

Generic EIS for Clearance of Solid Materials, U.S. Nuclear Regulatory Commission (NRC), 2003-2004. Technical analysis of alternatives for disposition of solid materials from NRC licensed and Agreement State facilities, with an emphasis on landfill and groundwater issues. Activities included determining the available capacities of existing EPA/State regulated Subtitle D landfills and low level radioactive waste (LLW) facilities nationwide. The analyses supported development of environmental review documents for a generic environmental impact statement.

Yucca Rail Alignment EIS, Department of Energy, 2004-2006. Technical lead for utilities, energy, and materials issues related to a proposed 320 mile railroad through southern Nevada and its alternatives. The NEPA-required EIS considered alternative rail alignments and non-rail options to transport spent nuclear fuel and high-level radioactive waste to the proposed Yucca Mountain Repository.

Surface Water and Groundwater Flow

Spreading Grounds Project, Los Angeles County Dept. of Public Works, 2005-2006. Developed and implemented a research program to determine the optimum level of turbidity for diverted river water accepted into the spreading grounds to maximize the artificial recharge of the regional groundwater aquifers. The program evaluated historical data, performed field and laboratory testing, developed analytical models, ran computer simulations, and installed and tested turbidity instrumentation.

Las Delicias, ITT Industries, 2002-2004. Performed infiltration and groundwater flow modeling for litigation support to forecast and hindcast groundwater pore pressures affecting slope stability. Computations included developing time-variant water balances over a 30 year period, considering precipitation, evapotranspiration, runoff, infiltration, and porous media flow; and verifying modeling results against field measurements.

Amuay Refinery Geoenvironmental Safety Program, Petróleos de Venezuela, S.A., 1979-1984. For a Venezuelan state-owned oil company, Mr. Grismala refurbished and enhanced an extensive groundwater monitoring network incorporating nearly 400 piezometers and monitoring wells. The groundwater data were used to develop a facility wide flow model to detect zones of water infiltration from process water losses, and to predict future areas of cliffside instability. Established criteria for maximum turbidity for groundwater seepage outbreaks along the toes of three earthen dams.

Big Four Dam, Borden Chemical Co., 1978-1982. Performed analyses, designed field instrumentation system, and interpreted results related to development of a layer of tailings fines to limit infiltration from a mine tailings reservoir. Flow and stability analyses confirmed the reservoir dam stability depended on developing an infiltration barrier created by settling suspended particles to restrict seepage into the underlying soils.

PROFESSIONAL AFFILIATIONS

Association of State Dam Safety Officials
American Society of Civil Engineers
Connecticut Society of Civil Engineers
United States National Society of the International Society of Soil Mechanics and Geotechnical Engineering

EMPLOYMENT HISTORY

ICF International	Technical Director	2008 – present
	Vice President	2002 – 2007
Arthur D. Little, Inc.	Principal	1998 – 2002
	Senior Consultant	1994 – 1998
Yankee Geotechnical	Owner	1978 – 1994

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Dean A. Gouveia — ICF International

Senior Technical Specialist Chemist

EDUCATION

J.D., New England School of Law, 2007, valedictorian, *summa cum laude*
B.S., Chemistry; B.S., Biology; Bates College, 1986

CERTIFICATIONS AND TRAINING

Member of Massachusetts Bar, 2007, #670924

EXPERIENCE OVERVIEW

Mr. Gouveia has over 25 years experience in evaluating and quantifying environmental impacts from contaminant releases. He provides specialized experience in sampling and analysis program design, quality assurance, and development of quantitative data analysis tools. His environmental sampling and analysis expertise ranges from design of sample collection programs through data quality assessment and final reports. He has applied his expertise on wide ranging projects including international environmental impact assessments (EIAs); environmental impact statements (EIS), Superfund, State, RCRA permitted, voluntary cleanup, and Brownfields sites; NRDA assessments; remediation design, pilot testing, and optimization; and long term monitoring and natural attenuation evaluation. He provides expertise in environmental chemistry from analysis through source identification, evaluation of fate, transport, and risk. His Quality Assurance expertise includes development and implementation of company-wide QA programs and project specific QAPPs, method and data validation, third party document review for oversight and litigation, and auditing of sample collection and analysis operations. His quantitative data analysis expertise includes development and use of sophisticated data management and analysis tools including customized database, GIS, statistical, and modeling applications

SELECTED PROJECT EXPERIENCE

Assessment of Inorganic Contaminant Fate, Transport, and Risk

Assessment of Coal Combustion Residue Proven Damage Cases, EPA ORCR 2010
Senior Chemist and Project Manager leading site assessment of 97 alleged damage cases nationwide in support of proposed rule and upcoming CCR regulation. Cases were raised by environmental and public awareness groups as instances of damage supporting the need for further regulation. Each site was assessed by compilation and review of relevant claims, technical literature, site studies, and regulatory actions to demonstrate whether CCRs were specifically implicated in actual or potential harm to human health or environment. Sites ranged from CCR generation at utilities through disposal in mine disposal, landfills, and impoundments or re-use as structural fill. Also examined were areas surrounding utilities where impacts to utility cooling reservoirs and lakes or residential areas were claimed. Many cases involved detailed studies to differentiate CCR impacts from coal mining wastes. Contaminants of concern were primarily inorganic (metals and metalloids) and distinguishing source identification involved assessment of relative concentrations, other contributors, and metals speciation.

Assessment of Metals in Coal Combustion Residues in Agricultural Uses, EPA ORCR. 2007- present
Senior Chemist leading EPA and USDA cooperative field studies and risk assessment for determination of hazardous constituents of coal combustion residues and their impact on potential beneficial re-use options in agricultural applications. Studies focused on determination of inorganic contaminants of FGD gypsum and impact to groundwater and surface water and uptake in agricultural applications. Agricultural land applications included studies on use of FGD gypsum to recover acid mine drainage impacted soils and mine spoil piles. He developed sampling and analysis programs to assess raw materials as well as agricultural field studies to test fate and transport including potential runoff, accumulation in soils, biota, and harvested crops. He oversaw the sampling programs implemented by USDA for EPA, coordinated sampling and analysis, managed laboratory subcontract analysis, and implemented systems for data quality review. He developed a risk evaluation framework and applied the data from the studies to screen which constituents required focused risk assessment.

Hazardous, Toxic, and Radioactive Waste Sites, US Army Corps of Engineers, 2000-present
Senior Chemist supporting the U.S. Army Corps of Engineers New England District in hazardous waste site investigation, remediation, and restoration. He provides expertise in sample collection design and protocols, field and laboratory analysis, quality assurance, and assessment of impacts and risk. He manages site investigations, designs and implements sampling and analysis programs, coordinates subcontractors, manages data validation and advanced data analysis, and meets with Army Corps clients, regulators and the public. Diverse sites have included former DoD burning grounds, former industrial manufacturers, military bases, textile mills, and abandoned mines.

Targeted Brownfields Assessment, US EPA 2008 – present.
Served as Quality Assurance Manager for nationwide EPA HQ Targeted Brownfields Assessment contract to develop site specific QAPPs, support design of sampling and analysis programs, and provide oversight of data analysis and interpretations. Sites ranged from former industrial factories, plating factories, mine tailings disposal areas, dry cleaners, gas stations, and rail transportation centers.

General Plan Update for City of Santa Clara, City of Santa Clara, 2008. Assessed hazardous waste management sites and concerns throughout the city to identify limitations to ongoing and future potential development for General Plan update. Developed hazardous waste and emergency response portions of the Opportunities and Challenges Report required under NEPA/CEQA requirements to modify General Plan. Evaluated impact to potential development of all CERCLA, State lead, and voluntary cleanup sites; underground and above ground tanks; landfills and hazardous waste disposal sites; TSDFs; and hazardous waste generators within the city.

Study of Mercury in Commercially Available Fish, US EPA, 2008-2009
Senior Chemist evaluating sampling and analysis protocols, data quality review and assessment, and quantitative and statistical analysis of mercury data from seafood samples. The study sought to better understand potential exposure to New York City residents obtaining fish from the New Fulton Fish Market, the most active fish market in the country. The study involved statistical sampling design including compositing to ensure representative samples, multiple laboratory analysis, and even DNA analysis of seafood to establish species without regard to market name. The study assessed statistical relationship with variables including size, weight, water body origin, species, and vendors. The risk based evaluation considered multiple international, federal, state, and industry criteria and action levels as well as a variety of potential sensitive receptors.

Industry Profiles of Primary Aluminum Industry for US EPA ORCR, 2008
Developed as primary author an industry profile on waste minimization opportunities in the primary aluminum industry for US EPA ORCR. The document for regional EPA distribution compiled for distribution information on process and management systems being implemented, underway, or being tested throughout the industry with a focus primarily on waste minimization of priority chemicals.

EIS for Uranium Enrichment facility, Nuclear Regulatory Commission, 2004-2005. Providing expertise in hazardous waste management issues in ongoing support of NEPA required EIS involving complex alternatives as to location, capacity, and potential dismantling of alternate uranium enrichment facilities. He supported overall EIS efforts with focus on major waste management issues both during production and during conversion and startup activities.

Site Investigation, US Army Soldier System Center, 1996 –present.
Senior Chemist supporting site investigation, remediation, and risk assessment of this federal facility. He has supported a number of tasks including field analysis, laboratory coordination, laboratory audit and assessment, data validation, interfacing with regulators, and supporting risk assessment and fate and transport studies. He has provided specialized expertise in a number of areas including development of novel data assessment procedures for complex matrices and sediment/fish sampling and analysis programs for risk assessment.

National Energy Technology Laboratory - Albany, Department of Energy, 2003- 2010
Senior Chemist supporting groundwater monitoring and evaluation program for a DOE Fossil Energy metallurgical research facility. Potential radioactive, volatile organic, and inorganic contaminants are being investigated using program of passive diffusion samplers, soil gas surveys, field analysis, and traditional sampling with off-site

laboratory analysis. Site contaminants potential impact to offsite indoor air quality has required innovative air analyses. He supported development and approval of planning documents, validation of non-routine methodologies, data analysis and report development.

Keystone Ordnance Works Site Investigation, U.S. Army Corps of Engineers, 2004-2006.
Project Manager for site investigation of former TNT manufacturing facility to assess presence of TNT breakdown products and inorganic contamination from processing to assess governmental responsibility for contamination. The World War 2 manufacturing area at one time consisted of over 14,000 acres and more than 500 buildings. He provided expertise in manufacturing processes, environmental breakdown and field analysis techniques to cost effectively screen broad areas. He oversaw all planning documents; managed field, chemistry, database, GIS, and report staff to meet client schedules and data needs; and provided quality report for immediate decision making.

West African Gas Pipeline EIA/EBS, 2002-2003
Lead Quality Assurance Chemist for major Environmental Impact Assessment and Environmental Baseline Study for West African Gas Pipeline including designing sample collection plans, laboratory auditing, and quality assurance oversight of multiple contractors. The project involved collecting, collating, and assuring quality of information from numerous in subcontractors and laboratories across multiple West African countries despite different languages, terminology, national regulations, cultures, and underlying objectives from the parties involved.

PEIS and Technology Studies for Chemical Warfare Materials, U.S. Army, 1998-2003.
Senior chemist managing teams responsible for designing and implementing sampling and analysis programs to assess chemical demilitarization treatment technologies. The development of test regimes included reviewing design specifications, permit requirements, and exposure limitations; selection of appropriate feed materials; determination of test conditions; development of reliable sampling and analytical methods; auditing and assessment of laboratories; and independent validation of all data. The EMIS system he developed provides complete cradle to grave tracking with audit trail capabilities. The system was critical to preparation of annual reports to Congress on capability of proposed technologies to meet environmental regulations and review by the National Research Council. Supported development of Programmatic EIS and site specific EISs for construction of chemical weapon demilitarization facilities.

Phase II Remedial Investigation of a Bayway NJ Refinery, ExxonMobil Corporation, 1996-2000.
Senior Chemist for a remedial investigation of a 1400-acre active refinery. He coordinated project chemists, field sampling teams, subcontracted laboratories, and information management specialists. Mr. Gouveia contributed to numerous work plans, reports, conceptual models and remedial planning documents associated with this effort.

Laboratory Quality Assurance Project Manager, 1998-2002
QA Project Manager independent of laboratory operations for several major projects at advanced chemical fingerprinting laboratory including PCB and petroleum fingerprinting in environmental samples including biota/tissue. For EPA Coastal 2000 and NavyClean programs lead internal audits, verified technical work products, and monitored corrective action plans.

Site Investigation at EPA Superfund sites, US EPA, 1993-2000
Coordinated sampling, analysis, and data assessment on dozens of Superfund sites throughout New England as a Lead Chemist for U.S. EPA contracts. He has served as Project Leader, Lead Chemist, QA Manager, Field Team Leader, and Data Manager in all stages of the CERCLA/RCRA investigation, removal, and remediation process. He was primarily responsible for development of planning documents, design of sampling and analysis programs, managing laboratory and data validation subcontractors; performing complex data assessments, and supporting project staff on chemistry issues.

EMPLOYMENT HISTORY

ICF International	Senior Technical Specialist	2002-Present
Arthur D. Little	Senior Manager	1993-2002
Raytheon United Engineers & Constructors	Senior Chemist	1992-93
Roy F. Weston	Project Scientist	1989-92
ENSR Consulting and Engineering	Chemist	1986-89

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Greg McGuire, P.Eng. **ICF Marbek**
Managing Director

EDUCATION

Graduate Queen's University Program for Public Executives, Kingston, Ontario, Canada, 1994
Master of Engineering (Environmental), Royal Military College (RMC), Kingston, Ontario, Canada, 1989
Bachelor of Engineering (Chemical), RMC, Kingston, Ontario, Canada, 1981

CERTIFICATIONS AND TRAINING

Environmental Auditing (Dalhousie University) - 1993
Advanced Facilitation – Algonquin Management Centre - 1997

EXPERIENCE OVERVIEW

Mr. McGuire is an expert on energy and environmental issues with over twenty-five years of experience in the development, management and evaluation of policy, programs and projects.

Mr. McGuire combines in depth technical knowledge with superior practical experience as a facilitator, project manager and public sector executive. He is fluent in both French and English.

Mr. McGuire has expertise in policy design and analysis, including strategic analysis of regulatory and economic instruments, stakeholder and public consultations; strategic and business planning, performance management and program evaluation; and management and technical studies, including technology and market assessments, energy and emissions modelling.

PROJECT EXPERIENCE

Policy Analysis

Climate change impacts and adaptation risk assessment for the Government of Alberta (in progress).

Assessment and comparison of environmental initiatives in the Asia-Pacific Gateway and Corridor (in progress)

Advice to the Commissioner of Environment and SD on environmental assessment jurisdictional coordination and on good practices for cumulative impact assessment (2010).

Study of approaches to account for sustainable development in policy decision-making for Commissioner of Environment and SD (2008).

Assessment of policy and program options to promote the use of renewable thermal energy in government buildings (2008).

Environmental Scan of the Environmental Risks and Regulatory Gaps Associated with the Federal House and Aboriginal Lands (2007).

Review of Canadian and international water quality management regimes (2006).

Benchmarking of Canadian and international regulatory regimes for biofuel facilities (2006).

Study of environmental monitoring and reporting in Ontario and review of best practices in leading jurisdictions (2002-2003).

Development of a legal and policy framework for environmental management of mining in Zimbabwe, including environmental assessment, mine site rehabilitation and environmental standards (1998-2001).

Analysis of the energy level playing field: government spending and regulatory regimes (1999).

Development of environmental indicators for the mining industry (1996).

Program Planning, Assessment and Evaluation

Strategic Environmental Assessment (SEA) of the Atlantic Gateway and Trade Corridor Strategy (2010).

Strategic Environmental Assessment (SEA) of the Continental Gateway and Trade Corridor Strategy (2009).

External Advisor to the Commissioner of the Environment and Sustainable Development on the audit of Air Quality Health Index (2009).

Strategic Environmental Assessment (SEA) of Regional Development Programs for Canada Economic Development in Québec Regions (2007)

Strategic Environmental Assessment of the Tsunami Reconstruction Strategy in Sri Lanka (2005).

Assessment of Options for Governance of a Federal Climate Change Impacts and Adaptation Program (2005)

Assessment of strategic opportunities to improve environmental performance of federal operations, based on recommendations from the Commissioner of Environment and Sustainable Development (2005)

Strategic Environmental Assessment manual and training for transportation policies and programs (2001-2004).

Audit of NRCan EA Program (2001-2004).

Strategic planning and program management for the development of Canada-Mexico Natural Resources Cooperation Agreements (2001).

Evaluation of Export Development Corporation's Environmental Assessment Framework (2001)

Situation assessment of the linkages between policy and science functions at Natural Resources Canada (2001).

Development of natural resources issue scan and background analysis for the Office of Auditor General (2000).

Development of Performance and Evaluation Framework for mining and metals R&D (1999).

Representative of Natural Resources Canada on Senior Management Committee on Environmental Assessment (1991-1995).

Technical and Market Studies

Business Plan for the capture of geothermal energy in mining facilities (2006).

Development of Project Design Document (PDD) for Pretoria Portland Cement fuel substitution project submission to the Clean Development Mechanism (2005-2006).

Calculation of Large Final Emitter GHG emission and intensity baseline for INCO (2004).

Environmental assessment case studies for Canadian International Development Agency (1999-2004)

Benchmarking environmental assessment frameworks for Export Credit Agencies (2000).

Review of AECL's EA screening of the sale of CANDU reactors to China (1996) and Turkey (1998).

Development of draft CSA voluntary standard for environmental assessment (1996).

Environmental assessment strategy for Low-Level Radioactive Waste Disposal Facility, Deep River, Ontario (1996).

Environmental Management System for the Canadian Environmental Assessment Agency (1996).

Environmental assessment manual for Natural Resources Canada (1995).

Coordination of Natural Resources Canada technical review of uranium mines in northern Saskatchewan (1994-1995). Expert testimony to Panel Review and coordination of advice to Cabinet.

Environmental assessment of Canadian policy on the visits of nuclear propelled and nuclear armed vessels (1991).

Environmental assessment of Project Swiftsure, a proposal to incinerate chemical weapons waste in Suffield, Alberta (1991).

Management of a PCB destruction project in Goose Bay, Labrador. This $15 million project included: project design; environmental assessment; extensive public consultations, media relations, and negotiations with stakeholders, including the Labrador Inuit; siting and construction of the facility; transportation of the PCBs; operation of the facility; implementation of the monitoring plan; and closure of the facility (1988-90).

Environmental quality monitoring of effects of Alert Sewage Discharge, Ellesmere Island (1988).

PROFESSIONAL AFFILIATIONS

Professional Engineers Ontario
Canadian Evaluation Society
International Association for Impact Assessment

LANGUAGES

English and French (fluent – Public Service Rating: EEE)

EMPLOYMENT HISTORY

ICF Marbek, Ottawa	Managing Director	2011–Present
Marbek Resource Consultants, Ottawa	Principal	1995–2010
Natural Resources Canada (NRCan), Ottawa	Director, Office of Environmental Affairs	1991–1995
Department of National Defence (DND), Ottawa	Head of Environmental Assessment, Directorate of Conservation and Environment	1990–1991
PCB Destruction Project, Goose Bay, Labrador	Project Manager	1988–1990
1 Construction Engineering Unit, Winnipeg	Project Engineer	1988
UN Disengagement Observer Force (UNDOF), Golan Heights	Canadian Contingent Engineering Officer	1984–1985
Canadian NORAD Region Headquarters, North Bay	Engineering Officer	1981–1986

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James E. Rice, P.G. **ICF International**
Senior Manager

EDUCATION

M.S., Geology, New Mexico Institute of Mining and Technology, Socorro, New Mexico, 1985
B.S., Geology, New Mexico Institute of Mining and Technology, Socorro, New Mexico, 1981

CERTIFICATIONS AND TRAINING

Professional Geologist – New Hampshire (#668)
OSHA 40 hour HAZWOPER training (1988) and annual 8-hour refreshers
OSHA HAZWOPER Supervisor Training (1989)
OSHA Construction Safety Outreach (2007)
UXO Basic Training, ITRC, Boston Massachusetts (2002)
Geothermal Heat Pumps: Concept to Completion (U Mass 2010)

EXPERIENCE OVERVIEW

Mr. Rice is a Professional Geologist with over 25 years experience in site investigation, engineering geology, geophysics, hydrogeology, and environmental impact assessment. He has conducted and directed soil, ground water and surface water investigations at hundreds of private and government sites for a wide range of industries and geographic settings. His experience also includes environmental litigation support and plant siting studies. He is the author of several papers and guidance documents on site investigation. Mr. Rice's background includes conducting geophysical surveys for environmental and engineering projects and working in oil and gas exploration.

RELEVANT PROJECT EXPERIENCE

Groundwater Investigation at Former Bureau of Mines Research Facility -Albany, U.S. DOE, Albany Oregon, Mr. Rice is managing several groundwater investigation, risk assessment and remediation planning tasks related to contamination at a former US Bureau of Mines metallurgical research facility. From 1943 to 1978 the facility conducted ore extraction, processing, and alloy research on a wide range of metals including titanium, zirconium, thorium, and uranium. Onsite waste disposal and waste management processes resulted in release of contaminants to groundwater and soil. Mr. Rice has conducted extensive groundwater investigations and analyses to identify the location and concentration of contaminants, and characterize the groundwater system. He developed reference concentrations of naturally occurring metals in groundwater to use as screening criteria for identification of potentially contaminated areas at the site, and prepared a comprehensive Conceptual Site Model that documents the groundwater conditions. Much of the current work is focused on the detection and fate and transport modeling of two organic compounds used in former extraction processes which have migrated offsite to residential areas and threaten a river.

Environmental Impact Assessment for Uranium Enrichment Facility, Nuclear Regulatory Commission. Mr. Rice reviewed geological and hydrogeological reports prepared by contractors in support of an Environmental Impact Assessment for a new uranium processing plant at the Portsmouth Gaseous Diffusion Plant in Ohio. He was responsible for preparing EIA report sections and assessing potential impacts of the proposed plant on geology, surface water, groundwater, and soil resources.

Groundwater Investigations at Fort Campbell, KY, U.S. Army. Mr. Rice managed more than 50 tasks in support of hazardous waste permits at Fort Campbell, Kentucky. Projects at this 164-square-mile active Army facility in complex karst terrain included soil and groundwater investigations, human and ecological risk assessments and a site-wide hydrogeologic evaluation to assess the contamination impacts on the on-site drinking water sources. Mr. Rice used a wide variety of techniques including passive soil gas surveys, surface and borehole geophysics, dye traces, storm-induced spring sampling, and long-term spring and well monitoring to understand groundwater and surface water connections and create a groundwater basin map. The fate and transport of contaminants through

the karst conduit system was determined by evaluating the transport of naturally occurring trace metals. The data was used to create a Conceptual Site Model describing the water quality and quantity of the integrated karst surface water and groundwater regime.

Geological Assessment of Construction Impacts in a Karst Area, Bermuda Properties Ltd. For a developer in Bermuda, Mr. Rice managed a series of studies for proposed construction projects at a resort in a karst area with numerous known and sensitive caves. In support of the first Environmental Impact Statement (EIS) required in Bermuda, Mr. Rice planned and managed geological, geophysical (microgravity and seismic), and geotechnical investigations of a 12-acre residential development in an area of known caves. A build/no-build map was generated for inclusion in the EIS. To support residential building permits, Mr. Rice developed a Cave Monitoring Plan, a Cave Water Mitigation Action Plan, a Photographic Survey Plan, and a Cave Cleanup Plan which were approved by the Ministry of Environment. He implemented the Photographic Survey Plan. In support of redevelopment of the existing facilities and expansion into undeveloped areas, Mr. Rice conducted a geophysical investigation of approximately 30 acres to identify caves and geotechnical conditions in proposed development areas. The permit was granted and the construction is underway.

Review of Environmental Impact Assessment for Coal to Liquids Plant, Mr. Rice assisted in the technical review of an environmental impact assessment for a proposed coal to liquids plant in Wyoming. The proposed action included a coal mine, storage yards, coal to liquids production facility, product and gas pipelines and a CO_2 pipeline for enhanced oil recovery. Mr. Rice supported the areas of geology, minerals resources, soil, and paleontology to assess impacts.

Environmental Impact Assessment, Chevron Nigeria. Mr. Rice managed the environmental impact assessment for a 4.4 billion natural gas development project to eliminate gas flaring and process the gas for sale. The project provided feedstock to an adjacent state-of-the-art gas to liquids plant and included assessing environmental and socioeconomic impacts from expanding and operating an onshore natural gas processing gas plant, constructing 200 kilometers of onshore and offshore pipeline, installing and operating new offshore gas production wells, production platforms and a floating marine terminal. The analysis included a baseline environmental survey and evaluation of alternatives for reducing emissions from drilling, pipeline pigging, plant maintenance and upsets. Mr. Rice developed a quantitative methodology to rank potential impacts and assess the residual impacts after mitigation.

Environmental Management Systems Review, Progress Energy Ventures. Mr. Rice provided technical support in the on-site review of environmental management systems and operations of coal mining operations in eastern Kentucky. The review evaluated risks and liabilities associated with ongoing operations, including surface and groundwater contamination from the mining activities.

Quality Assurance Assessments, Rio Tinto. Mr. Rice was the Technical area specialist for a review of how a leading international energy company generates land and water impacts data presented in its annual environmental stewardship report. Through interviews, document reviews, and site visits to coal mines in Wyoming and Montana, Mr. Rice evaluated the methods various operations and subsidiaries used to calculate their water usage, water recycling, land disturbance, and land restoration. The methods were evaluated for thoroughness, accuracy, and consistency across operations. Mr. Rice prepared Quality Control Standards for data submissions.

DOE Tiger Team, U.S. Department of Energy HQ. As part of the U.S. Department of Energy's (DOE's) Tiger Teams, Mr. Rice performed audits of seven DOE nuclear and fossil fuels facilities to evaluate ground water protection and monitoring programs and inactive waste site management programs. These intensive 14 to 50 day audits included daily debriefings with the facility and regulators, and culminated in a report of findings. As a member of the team, Mr. Rice included reviewed ground water and soil contamination investigations for completeness and accuracy, assessed ground water monitoring and protection programs, and reviewed the facilities' regulatory compliance with DOE Orders, and state and federal regulations. Mr. Rice assisted in the development of Performance Objectives for ground water protection at DOE facilities.

Mr. Rice has conducted or managed over 200 environmental site assessments and due diligence reviews in the US, Canada, and Europe for law firms, developers and Fortune 500 companies. Property types included

undeveloped areas, mines, oil and gas fields, steel mills, ore processing facilities, and heavy manufacturing facilities. Many assessments included sampling of soil, waste, and ground water monitoring wells. The following examples illustrate the range of projects.

- Due Diligence/Liability Assessment, Metal Company. Predivestiture due diligence assessment at an aluminum refinery in St. Croix. Included liability estimates for capital and ongoing expenditures.

- Due Diligence/Liability Assessment, Cement Company. Phase I environmental liability assessments for a large international cement manufacturer at three limestone quarries and associated Redi-mix plants in Kentucky. Significant issues at the quarry sites included fugitive dust, storm water runoff, possible stream impacts from low pH runoff, and past use of oils for dust suppression.

- Due Diligence/Liability Assessment, Chemical Company. Assessment of liabilities at four chemical manufacturing facilities in the U.S. to support sealed bid auction. Follow-on work included assessment of numerous third party and previously owned sites. Cost estimates for cleanup and operations were prepared under several future use scenarios.

- Due Diligence/Liability Assessment, Metals Company, 1998. Health, Safety and Environment assessment of four aluminum plants in Italy. Plants included a refinery/smelter, two extruded aluminum products plants, and a stamped products mill.

AWARDS AND TRAINING

Excellence in ESS&H Award, US Department of Energy, Office of Fossil Energy, presented to Mr. Rice November 2004

Certificate of Outstanding Achievement for Professional Services, from Fort Campbell/ Nashville Corps of Engineers, 1999

EMPLOYMENT HISTORY

ICF International	Senior Manager	2002-present
Arthur D. Little, Inc.	Senior Manager	1991-2002
Weston Geophysical Corp.	Geologist	1986-1991
Independent Consultant	Petroleum Geologist	1982-1986
Schlumberger Well Services	Field Engineer	1981-1982
Los Alamos National Laboratory	Technician	1979

ICF Marbek
an ICF International Company

Greg Summers **ICF Marbek**
Regulatory Specialist

EDUCATION

MS, Range Science (wetland emphasis), North Dakota State University, Fargo, 1993
BS, Reclamation (biological emphasis), University of Wisconsin, Platteville, 1990

CERTIFICATIONS

Professional Wetland Scientist - 0001152
Certified Wetland Delineator, U.S. Army Corps of Engineers, Seattle District

TRAINING

Basic Wetland Delineation, Wetland Training Institute, Inc.
Wetland Delineation Practicum, Wetland Training Institute, Inc.
Creating Wetlands for Habitat Enhancement and Mitigation, University of Wisconsin
Wetland Soil Geomorphology
Data Quality Objectives/Streamline Approach for Environmental Restoration
Department of Energy Secretarial Policy on NEPA
Covey Principle Centered Leadership, 1995
Plant Identification, Wetland Training Institute, Inc.
Total Quality Management Training Seminar
Hazardous Waste Training Program in accordance with OSHA at 29 C.F.R. 1910.120 (40 hours)
Supervisor OSHA Course (8 hours)

EXPERIENCE OVERVIEW

Mr. Greg Summers is a NEPA specialist and senior wetland scientist. He prepares EISs, EAs, BAs, BEs, and threatened and endangered species surveys. Greg manages all varieties of wetland and biological projects and performs wetland delineations, impact assessments, functions and values assessments, permitting, and mitigation. He manages projects in support of land-use planning, Section 404 permit applications, and state and local wetland enforcement activities, including the Land Conservation and Development Commission. Greg has provided expert testimony at public land-use hearings. His responsibilities also include marketing, project budgeting, scheduling, quality assurance, and quality control.

Project Oversight. Greg has served as Project Director various types of projects throughout the western US varying from large controversial NEPA EISs to small wetland delineations. His duties include assisting and oversight of project scoping, field oversight, document oversight QA/QC, budget tracking, client interactions, and oversight of personnel among others.

Mining. Greg's mining experience includes coal (strip and open pit), hard rock, and gravel and includes mine siting, mine expansion, and future mine phase projects. His responsibilities for these projects includes NEPA compliance, regulatory permitting (CWA, ESA, CAA), baseline assessment and impact studies for mine siting, future mine phases, and permit boundary expansion. He has worked on mines in ND, OR, WA, WI, and WY. Mr. Summers also has experience in mine reclamation and mitigation.

NEPA Compliance. Greg is experienced in the interpretation and implementation of the NEPA Guidelines of a variety of federal agencies including BLM, BOR, DOE, FHWA, USFS, USFWS, FAA and U.S. Army Corps of Engineers, and has worked with multiple federal agencies on federal and state environmental regulatory processes, including Office of Surface Mining, U.S. EPA, U.S. Fish and Wildlife Service, National Park Service, National Marine Fisheries Service and others.

Regulatory. Greg's regulatory experience includes the National Environmental Policy Act (EIS and EA), Endangered Species Act including wildlife, plants, and fish, Section 404 and 401 of the Clean Water Act, the Clean Air Act, and NHPA. His experience includes regulatory compliance and documentation with these acts.Mr.

MINING PROJECT EXPERIENCE

Independent Internal Adequacy Review of a Environmental Impact Report for a Proposed Copper Mine —Nicolet Minerals Company, LLC, WI. Subject Matter Expert/Project Manager. This project entailed an adequacy review of an Environmental Impact Report (EIR) prepared by several firms for Nicolet Minerals Company, LLC (NMC). Greg was part of a team of reviewers that reviewed the entire EIR. He was responsible for reviewing the biological sections (wetlands, wildlife, plants, endangered species, soils, land use, fisheries, etc.) and general project management. Results from the review were provided to NMC in oral and written format.

McClelland Lake Wetland Complex Functional Assessment Approach—Petro-Canada Oil Sands, Inc. (Suncor Energy Ltd.), Fort McMurray, Alberta, Canada. Project Director. Greg has overseen the development of a draft wetland functional assessment methodology for the McClelland Lake Wetland Complex, an 18-square-kilometer, highly diverse wetland system proposed for oil-sands mining. Met regularly with a multi-stakeholder committee composed of representatives from the industry, provincial regulatory agencies, and Aboriginal communities to develop a consensus on the definition of key project terms and identify the wetland functions occurring in the system and the indicators that could be used to assess them. Reviewed existing scientific studies on wetland functional assessment, boreal peatland ecology, and the affects of oil-sands mining on wetlands. Compiled information provided by multiple technical experts into a comprehensive functional assessment report.

Wetland Policy White Paper—Shell Canada, Inc., Alberta, Canada. Project director for developing a white paper on the status of the science and policy regarding wetland regulations in Canada and its potential impact on mining. The paper focused on the comparison of Alberta and Canada wetland regulations with Washington State and the United States regulations.

Centralia Mine West Field Expansion Project— TransAlta Centralia Mining LLC, Lewis County, WA. Project Director. TransAlta Centralia Mining (TCM) has identified lands immediately west of the Centralia Mine permit area as a potential source of additional coal to supplement the permitted reserves at the mine. In support of future permitting to expand the existing permit area boundary, TCM investigated the environmental resources present in the West Field expansion area that could be affected by any mining operations there. ICF managed the documentation of the baseline environmental conditions for wildlife resources, fishery resources and wetlands that occur on and around the West Field expansion area, and prepared the baseline wildlife, wetlands, and cultural resources reports. For the baseline wildlife effort, existing wildlife habitats on the expansion area were mapped, wildlife expected to occur in the expansion area were identified, and an assessment was made of the likelihood that the expansion area supports candidate, proposed, threatened or endangered wildlife species identified by federal or Washington state agencies.

Buckskin Mine Hay Creek II Amendment Area Wetland Delineation—Buckskin Mining Company-Kiewit Mining Properties, Inc., Gillette, WY. Project Director. Greg oversaw the methodology for delineating potential wetlands and other waters of the U.S. within the 1,009 acre Hay Creek II Amendment Area at the Buckskin Mine, the northernmost surface coalmine in Wyoming's Powder River Basin. He supervised the Collection of field data on the existing wetlands and other waters of the amendment area, and mapping of their boundaries. Reviewed and quality checked a detailed wetland delineation report submitted it to the Wyoming Regulatory Office of the U.S. Army Corps of Engineers for review and concurrence.

Buckskin Mine Permit Area Delineation and Nationwide Permit 21 Renewal Application—Buckskin Mining Company-Kiewit Mining Properties, Inc., Gillette, WY. Project Director. Supervised the delineation of potential wetlands and other waters of the U.S. within the existing 8,011 acre WDEQ-LQD permit area of the Buckskin surface coalmine as part of the mine's renewal application to the Corps for coverage under Nationwide Permit 21. The project involved Reviewing previous delineations, Section 404 Permits, mitigation plans, and monitoring reports to compile a comprehensive history of the wetland permitting and mitigation performed on the site to date. Supervised the collection of field data on the existing wetlands and other waters of the permit area and mapped their boundaries and the preparation of a detailed wetland delineation report submitted it to the Wyoming

Regulatory Office of the U.S. Army Corps of Engineers for review and concurrence. Oversaw the preparation of a Corps' Pre-Construction Notification to renew the mine's coverage under the Corps' Nationwide Permit 21 for proposed future coal extraction operations in the permit area.

Mining Mine-Wide JARPA Permitting and Mitigation Planning—TransAlta Centralia Mining LLC, WA. Project Director. Greg oversaw the preparation of mitigation plans for various mining related projects requiring JARPA. Work included assessing direct and indirect wetland impacts and meeting with agencies to develop the appropriate wetland and stream mitigation plans. Mitigation plans included biological and engineering report to describe the mitigation approach. Greg managed staff to prepare support JARPA documents such as BAs and Section 106 reports for submittal to permit agencies. He conducted meetings with agencies to discuss mitigation options and obtain JARPA related permits.

Big Hanaford Creek Construction Plans, Observation and Monitoring—TransAlta Centralia Mining LLC, WA. Project Director. Greg supervised the development and preparation of construction bid documents for a 150 acre wetland and stream restoration project and assisted project owner in the bid selection process. ICF prepared a construction observation and monitoring plan to provide on-site review of the excavation of a new stream channel, construction of large woody debris stream structures, and installation of over 300,000 native trees, shrubs, and emergent plants. We prepared daily field observation forms with observations made and recommendations to the project owner.

Pond 3B Natural Resources Assessment—TransAlta Centralia Mining LLC, Lewis County, WA. Project Director. Supervised the evaluation of natural resource value of wetlands associated with Pond 3B, a 115-acre coal fines refuse pond on the Centralia Coal Mine property where a functional wetland community has developed across much of the shallow water portions. Oversaw the documentation of wetland, aquatic, and wildlife resources and evaluated overall functional value of developing wetland. We noted opportunities where active management could be employed to enhance similarly created wetlands and improve habitat conditions for fish and wildlife.

Centralia Mine Sensitive Species Assessments—TransAlta Centralia Mining LLC, Lewis and Thurston Counties, WA. Project Director. TransAlta Centralia Mining is preparing a permit renewal application for submittal to the U.S. Office of Surface Mines (OSM) to renew coal-mining leases at Centralia Mine in western Washington. OSM requires the 14,450-acre mine, in operation since 1969, to renew its operating permit at a maximum of 5-year intervals through the life-of-mine permit (2025). Greg supervised the preparation of a BA (federal) and a biological report (state) to determine whether renewal of mining operations is likely to affect any federal or state proposed, threatened, endangered, or sensitive species, as well as federally proposed or designated critical habitat. The BA addressed coastal cutthroat trout, bull trout, coho salmon, Olympic mudminnow, Bald Eagle, Oregon spotted frog, mardon skipper, white-topped aster and small-flowered trillium.

Pit 20 Wetland Mitigation Plan and Planting Plan—TransAlta Centralia Mining LLC, Lewis County, WA. Project Director. Evaluated the feasibility of creating viable wetland habitat at the Pit 20 site, an old coal mine pit undergoing reclamation. Historic wetland conditions were reviewed, on-site conditions were assessed, bathymetry of the Pit was examined, and water quality was reviewed for potential contaminants. A detailed wetland mitigation plan was prepared that outlined landscape conditions, grading, hydrology, target wetland/riparian habitats, seeding and planting plans, special habitat features to benefit fish and wildlife, and wetland functions to be achieved. The plan was used by TCM to seek a land use change from the Office of Surface Mining.

EIS, Crown Jewel Gold Mine—Tonasket, Washington**.** Environmental scientist. Greg was responsible for mapping forest stands and collecting biological data for a proposed gold mine in Northern Washington State. The maps were uploaded into a GIS layer to determine potential impacts and the data was input to the U.S. Fish and Wildlife Service (USFWS) habitat evaluation procedures (HEP) model. Results from HEP model were used to evaluate impacts of proposed mine construction and were incorporated into EIS being prepared for the US Forest Service. Greg wrote several technical portions of EIS and reviewed other sections of the EIS.