RABIA ZEYNEP SARICA LECLERC, Ph.D., E.I.T.

Senior Engineer, Energy

Years with the firm

3.5

Years total

18

Professional qualifications

Engineer – In – Training

Areas of practice

Analysis and Design – Geotechnical, Dams, Seismic

Languages

English

Turkish

CAREER SUMMARY

Rabia Z. Sarica LeClerc is a senior engineer experienced in geotechnical investigations, seismic site response and liquefaction, slope stability, seepage, bearing capacity, and settlement analyses for hydro, nuclear, solar, and wind energy projects. Her responsibilities as part of the US hydropower group and her past experience have included performing dam inspections, preparing work plans, performing field investigations and dam stability evaluations, assisting dam repairs (design and construction) and embankment seepage controls, and forensic dam stability analyses.

EDUCATION

Ph.D., Civil Engineering, North Carolina State University	2005
M.S., Civil Engineering, Boğaziçi University – Turkey	2001
B.S., Civil Engineering, Istanbul University – Turkey	1997

ADDITIONAL TRAINING

ASDSO Webinar, Seismic Analyses of Embankment Dams	2019
Introduction to FERC Hydropower, EUCI Course, Boston, MA	2018
37th Annual USSD Conference, Anaheim, California	2017
Emerging Leaders Program, Charlotte, NC	2014
EERI Seminar Series Next Generation Attenuation (NGA) Models, Los Angeles, CA	2009
Computational Geomechanics, Dynamics, and Plaxis Workshop, Evanston, IL	2007
Use of Underground Imaging Technology to Map Buried Utilities, Special Program for the Construction Industry organized by GPRI and NYSDOT, Latham, NY	2006
NEES 2nd Centrifuge Research and Training Workshop, Rensselaer Polytechnic Institute, Troy, NY	2005

PROFESSIONAL MEMBERSHIPS

American Society of Civil Engineers

Boston Society of Civil Engineers

Association of Dam Safety Officials

GeoInstitute

International Society of Soil Mechanics and Geotechnical Engineering

PROFESSIONAL EXPERIENCE

Geotechnical

- UPEPO, Masaiti Energy Center, Copperbelt Region, Mpongwe, Zambia: technical guidance and assistance for the geotechnical investigation program for the feasibility studies for the USTDA funded 150 MW Wind and Solar energy project.
- Cubico Projects: Reviewed geotechnical reports, foundation and geotechnical design calculations and drawings for the projects below (WSP is the Owner's Engineer):
  - Palmetto Plains Solar Farm, Bowman, SC, USA
  - Wagyu Solar, Damon, TX, USA
  - Crooked Run Solar, Willard, NC, USA
  - Huntley Solar, Bowman, SC, USA
- BTSA Buipe Solar PV Project in Ghana, feasibility and development studies: preparation of scope of work and RFPs for geotechnical and surveying services, preparation of geotechnical report.
- Quaint 40 MW Solar PV Project in Nyakwere, Kenya: preparation of scope of work and RFPs for geotechnical and surveying services, preparation of geotechnical report.
- MetroVancouver – Cleveland & Seymour Falls Dams Tectonic Tilting Vulnerability Assessment. Conducted a geological/geotechnical evaluation to identify the potential for ground level tilting towards the dams or along the tops of the dams due to tectonic processes, active faults, and regional and local seismicity. Canadian as well as Northwestern United States seismic and tectonic sources were considered in the study. Team work with US-Boston and Canadian WSP teams.
- Cargill Avery Island Salt Mine Flooding Inlet Structure – Design of Timber Piles Supporting Water Conveyance Structure Slab for Axial Uplift Capacity.
- Logan Airport C2B Extension Project and Terminal E Parking Garage Project, MassPort. Inspected and logged SPT boreholes. The work also included visually classifying soils and rock, and taking undisturbed clay samples for triaxial testing.
- Hanover Mall Bridge Project (National Grid): Monitored and logged the SPT boring next to Third Herring Brook near the existing bridge pier.
- Philips 66 – Clemens Caverns Pile Foundation Design – Prepared design calculations for timber piles and H-piles to support the building structures, mud pumps, tanks, hoppers, and rig.
- York Correctional Facility, Niantic, CT: preparation of scope of work for geotechnical investigation program and engaging geotechnical contractors, and performing site inspections for the ongoing construction.
- St. Clair LPG Terminal Secondary Brine Disposal Well: Prepared drill pad earthwork specification
- Vogtle Energy Generating Plant Units 3 & 4: Subsurface soil investigations and identification of soil properties, bearing capacity, settlement, liquefaction analyses, seepage and slope stability calculations, assessing the design seismic acceleration for balance of plant structures, elastic moduli estimation from heave monitoring instrumentation data, accidental heavy load drop impact analysis, preparation of specifications, geotechnical design criteria report, review of vendor documents and peer work including cyclic triaxial test and MASW test results, identification of

open items in calculations and their impacts on other documents and the design and construction

- V.C. Summer Energy Generating Plant Units 2 & 3: Dynamic impact of heavy lift crane accidental load drop on the existing energy generating unit, assistance in predicting vibrations for Unit 2 Turbine Building blasting plan
- Exelon FLEX Project: Bearing capacity, liquefaction, and slope stability calculations, review of peer calculations for eight nuclear power plants.
- WS Lee Lee III Nuclear Station, Units 1 and 2: Settlement calculations, additional subsurface investigation program, heavy haul road subgrade calculation, assisting in determination of the future seismic monitoring locations, review of peer work
- Davis-Besse Nuclear Power Plant ISFSI Project: One dimensional dynamic site response analysis for soil-structure interaction (SSI) analysis, evaluation of liquefaction potential, preparation of engineering scope of work for SSI analysis.
- V.C. Summer Energy Generating Plant Unit 1 ISFSI System: Liquefaction analysis and engineering review of geotechnical design criteria document and other calculations
- Perry Nuclear Power Plant ISFSI System: Settlement analysis, one dimensional dynamic site response analysis, liquefaction and post liquefaction settlement analyses
- DC Cook Nuclear Power Plant ISFSI System: One dimensional dynamic site response analysis, liquefaction and post liquefaction settlement analyses
- Waterford Power Plant: Liquefaction and post liquefaction settlement analyses
- NRG Dunkirk Power LLC, New York: Settling Pond Stability with Trona RR Tracks
- India Kovvada AP1000 Reactors: Geotechnical laboratory investigation plan as part of feasibility studies
- Aliso Canyon Pipe Bridge Project: Initial Group and L-Pile analyses to support in designing the deep foundations that would support the pipe bridge
- Designing excavation support system for a project involving an expansion structure right next to a 5-story school building using Plaxis geomechanics software.

Dams – Waterways Projects

- Chilhowee Dam South Embankment, Tallassee, TN (Brookfield Renewable): Prepared Drilling Program Plan (DPP) for identification of subsurface materials and installation of observation wells.
- Turners Falls Power Canal Left Embankment, Montague, MA (FirstLight Power Resources): Prepared Drilling Program Plan (DPP) for identification of subsurface materials and installation of observation wells. Performed field identification of soft and wet areas at the toe of the downstream slope for both periodic monitoring purposes and for identifying the most representative boring locations for the planned seepage analyses. Inspected the performance of sonic borings with SPT sampling, and installation of the observation wells. Identified samples to be tested in the laboratory for gradation and index properties. Performed seepage analyses that also included identifying threshold and action levels for the observations wells; prepared a comprehensive report – in FERC review.
- Atmos, 138 kV Transsmission Line, Substation and New Leach Plant, AndersonCounty, Texas: Performed slope stability analyses for the brine pond.
- Helen Gould Dike (Brookfield Renewable, NY East): Slope stability analyses of original and repaired sections; critical gradient and stability calculations for flood

wall design to increase free board at the top of the dike to resist the updated spillway design flood; writing specification items for the flood wall design and construction; updating slope stability related portions of the STID; and assisting the client with the flood wall construction permit application.

- Santeetlah Station (Brookfield Renewable, NC): Data collection, review and evaluation for the concrete gravity and arch dam with a history of AAR growth. The instrumentation includes visual monitoring, deformation monitoring (survey, inclinometers, and extensometers), piezometers, thermistors, crack gages, seepage gages, and water level monitoring devices.
- Afobaka Dam (Suralco, Suriname): Assistance in preparing the final report for provisions for flow stoppage in relation to a probable failure mode; filter compatibility evaluation for East Saddle Dikes (ESDs); review of filter compatibility, and liquefaction potential calculations for East and West Dikes; preliminary assessment of discharge capacity of ESDs.
- Coneross Dam, Seneca, SC (Enel): Rock mapping at the spillway channel and friction angle calculation in support of the stability analyses.
- Great Falls, Peterson, NJ (Eagle Creek): friction angle calculation in support of the stability analyses.
- Chilhowee Dam, Tallassee, TN (Brookfield Renewable): Prepared bedrock friction angle calculation in support of the seismic/dynamic analyses.
- Chilhowee Dam North Embankment, Tallassee, TN (Brookfield Renewable): Filter compatibility analyses for the existing embankment materials, self-filtering analyses for the existing fine and medium filters, Secant wall box cement bentonite lift thickness calculation, excavation slope stability calculation, field inspection during rebuild of the clay core, filters, and rockfill of the new embankment segment.
- Chilhowee Dam, Tallassee, TN (Brookfield Renewable): Calculation of dynamic water pressures for the seismic stability analyses of the dam and the appurtenant structures as well as reviewing and summarizing the ANSYS seismic analysis outputs.
- By-pass Spillway Chute at Narrows Dam, Badin, NC: Review of existing information to help in assessment of potential scour probability.
- New Orleans Plaquemines Parish Levee Repairs After Hurricane Katrina : Forensic analysis of the excessive settlement and lateral flow immediately after the repair fill placement
- New Orleans Inner Harbor Navigation Canal Project : Calculation of the unbalanced lateral forces to be carried by pile foundations for barge swing gate design
- Army Corps of Engineers Houma Navigation Canal Project : Sheet pile wall design
- Army Corps of Engineers FUSRAP New Jersey : Soldier pile and lagging design
- Oconee Nuclear Station External Flood Protection Project : Slope stability analyses, partially saturated seepage analysis, review of peer calculations
- Wachusett Dam Spillway Improvements and North Dike Modifications for Massachusetts Water Resources Authority (MWRA): Planning and executing the subsurface soil investigation program, evaluation of liquefaction potential and associated deformation at North Dike, Auxiliary Spillway grading and gabion wall design, final design drawings, quantity take-off, and engineer's estimate.
- Ponkapoag Dam Inspection and Phase II Studies for Department of Conservation and Recreation (DCR): Planning and executing the subsurface soil investigation

program, seepage, and slope stability evaluation for existing and proposed design conditions

- Wolfeboro Sewer Lagoon Dam in NH: Seepage and slope stability analyses and filter design check on the existing filter materials at the toe of the dam.
- Warners Pond Dam: Filter design for the glacial till dam core on the downstream face for contract plan and specifications.
- Centennial Dam in Dedham MA: Embankment dam, with a spillway constructed of concrete with some stone and brick in the side walls, approximately 15-ft high. Assisted in investigation of the stability of the dam for DCR. Monitored and directed the SPT borings and installation of observation wells, performed stability analysis.
- Dean Pond Dam in Oakham MA: Rehabilitation and Modification of Dean Pond Dam and Spillways. Monitored and directed the SPT borings and installation of observation wells. Performed field hydraulic conductivity testing.
- Manns Pond Dam in Sharon MA: Monitored and directed the SPT borings and installation of observation wells. Performed field hydraulic conductivity testing.

Research

- Ph.D. Dissertation: “Wavelet Analyses for Seismic Ground Motion, Simulation, and Stochastic Site Response”.
- Research Assistant in the Department of Civil, Construction, and Environmental Engineering at North Carolina State University: Projects included “Load and Resistance Factor Design (LRFD) for Reliability Analysis of Driven Piles in North Carolina”; “Traffic Control Design for Portable Concrete Barriers,” for North Carolina Department of Transportation (NCDOT).
- Research Assistant in the Department of Civil Engineering, Karl Terzaghi Geotechnics Laboratory at Boğaziçi University, Istanbul, Turkey: Analyzed soils by conducting laboratory tests including triaxial, direct shear, consolidation, permeability, CBR, gradation, and index testing for many large and small commercial projects as part of an outreach program; participated in Reconnaissance Survey Program with Japanese Engineering Groups (AIJ, and EDM) after the August 17, 1999 Earthquake in Adapazari, Turkey; participated in structural analysis of existing buildings in Bogazici University campuses as part of a team consisting of Civil Engineering Department research assistants.

Teaching

- Teaching Assistant in Department of Civil, Construction, and Environmental Engineering at North Carolina State University: courses taught and assisted are Engineering Behavior of Soils; Engineering Behavior of Soils Laboratory; Hydraulics of Groundwater Distance Education; Mechanics of Solids.
- Teaching Assistant in Civil Engineering Department at Boğaziçi University: courses taught and assisted are Earth Science and Engineering Geology; Soil Mechanics; Soil Mechanics Laboratory; Engineering Graphics.

PUBLICATIONS AND PRESENTATIONS

- Sarica, R. Z., “An Accidental Load Drop Impact Study at a Nuclear Power Plant Site,” Presentation at Yeditepe University, Istanbul, Turkey, September 3, 2010.
- Sarica, R.Z., Selection of an Appropriate amax for Liquefaction Analyses from One-Dimensional Site Response Analyses, 5th International Conference on Recent

Advances in Geotechnical Earthquake Engineering and Symposium in Honor of Prof. I.M. Idriss, May 2010.

- Sarica, R. Z. and Washer, E., “The Nuclear Renaissance: Licensing and Seismic Design Considerations for New Power Plants,” Presentation at the Boston Society of Civil Engineers Section One-Day Seminar Titled Energy and Sustainability in Geotechnical Engineering, September 3, 2009.
- Sarica, R. Z., "Time-Frequency Analysis of Ground Motion: A Comparison of Some Available Methods," GeoCongress 2006, Atlanta (Feb 2006).
- Sarica R. Z., Kick-off meeting presentation at NCDOT for the “Traffic Control Design for Portable Concrete Barriers for NCDOT” project (Jul 2004).
- Sarica, R.Z., Rahman, M.S., "Seismic Response Characteristics of Sand Sites Using Wavelets," Poster Presentation, 8th U.S. National Conference on Earthquake Engineering, San Francisco, California, April 18-22, 2006.
- Sarica, R.Z., Rahman, M.S., "Analysis of Ground Motion: A Comparison of Some Available Methods," GeoCongress 2006, Atlanta, February 26-Mar 1, 2006.
- Sarica, R. Z. and Rahman, M. S. "Interpretation of Seismic Response of Sites Using Wavelet Transform, Proceedings of the 1st International Workshop on Applications of Wavelets to Real World Problems," pp.259-270., Istanbul Commerce University, Istanbul / Turkey, Jul 17-18, 2005.
- Kim, K.J., Rahman, M.S., Gabr, M.A., Sarica, R.Z., Hossain, M.S. "Reliability Based Calibration of Resistance Factors for Axial Capacity of Driven piles," Geotechnical Special Publication, n 130- 142, Geo-Frontiers 2005, pp.735-746.
- Sarica, R. Z. and Rahman, M. S. "A Wavelet Analysis Ground Motion Characteristics," Proceedings of U.S. - Taiwan Workshop on Soil liquefaction: lessons learnt from Chi-Chi earthquake, sponsored by NSF and NSC, Taipei, Taiwan, Nov 2003.
- Kim, K.J., Sarica, R.Z., Hossain, M.S., Rahman, M.S., and Gabr, M.A. "Development of Resistance Factors for Axial Capacity of Driven Prestressed Concrete Piles by the Vesic Method in the Coastal Region of North Carolina," (2003), TRB 82nd Annual Meeting, Washington, D.C. Jan 12-16, 2003.