

RICHARD D. BRITTON, P.G.

VICE PRESIDENT OF SITE INVESTIGATION

EDUCATION

M.S. Environmental Science Rutgers University	1992
B.S. Geology and Chemistry Rutgers University	1982

REGISTRATION AND CERTIFICATION

Professional Geologist, Pennsylvania	PG-001537-G
Professional Geologist, Delaware	No. S40000991
Professional Geologist, Tennessee	No. TN 1410
Certified by NJDEP as a Temporary Licensed Site Remediation Professional (LSRP)	LSRP #509384
Certified NJDEP Cleanup Star	
Certified by NJDEP to Conduct Underground Storage Tank Closure and Subsurface Investigations	UST No. 0009987
NJDEP Unregulated Heating Oil Tank (U-HOT) Certification	
Certified to Conduct Underground Storage Tank Removal/Abandonment - DE	UST No. A6671
Completed 40 Hour OSHA Training Course and Annual Updates	

RESPONSIBILITY AND EXPERIENCE, WHITMAN

Mr. Britton joined Whitman in June 1989. As Vice President of Site Investigation, Mr. Britton is responsible for technical leadership, mentoring, and direction on a company-wide basis. He has co-authored several publications describing innovative investigative techniques for bedrock aquifers that result in a more economical and efficient remediation approach. Mr. Britton works with attorneys as an expert on matters of cost allocation, liability, insurance, and remediation and has prepared expert reports for litigation on these issues. Mr. Britton's recent professional assignments are described below.

Mr. Britton designed and performed a multi-million dollar remedial investigation at a 37-acre industrial facility located within the Newark Basin (Passaic Formation). He was project manager for the ground water portion of the investigation, which included analysis of the impact of on-site contamination on the nearby municipal well field, which tapped the fractured bedrock aquifer. Mr. Britton employed several innovative bedrock investigative techniques in order to elucidate the architecture and contaminant flow pathways of the dipping bedrock structure at the industrial facility and surrounding area. Proper interpretation of hydrogeologic data was critical to the design and success of the selected remedial action which included sealing the large open interval of an on-site production

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well. Soil issues involved closure of eight USTs and remediation of widespread, random PCB contamination. Because of the extensive nature of the PCB soil contamination, the NJDEP accepted innovative investigative and remedial measures for soil.

Mr. Britton designed and implemented a Ground Water Quality Study in order to determine if an NJPDES-permitted wastewater discharge was affecting downgradient ground water above NJDEP's II-A Ground Water Quality Criteria. In order to make such a determination, the hydrogeologic characteristics of the various water bearing and confining units underlying the site were defined. An understanding of how the various water-bearing zones influence and interact with one another was developed. This conceptual hydrogeological model, together with an assessment of background water quality and identified downgradient receptors, provided a foundation upon which the impact of wastewater discharge was modeled, analyzed, and assessed.

Mr. Britton designed and implemented a hydrogeological investigation in support of a passive/natural ground water remediation program for a site involving ground water contaminated with chlorinated organics compounds. The source of ground water contamination was contaminated sediments and soil underlying an on-site pond used to discharge chlorinated solvents. The hydrogeological investigation involved providing site-specific hydrogeological data and analysis that demonstrated the absence of current and future downgradient receptors. The investigation also confirmed the inadequacy of the affected water bearing zone to serve as a useful, productive or practical source of ground water. An area-wide hydrogeological cross-section was prepared to illustrate the thinness and small lateral extent of the contaminated aquifer and the eventual discharge point of ground water leaving the site. Source removal of contaminated pond sediments and soil was proposed in support of the passive/natural ground water remediation approach.

Mr. Britton facilitated an expedited closure approval for a site involving the removal of 12 leaking USTs in a mixed commercial and residential community. Timely completion of the closure was critical for the seller of the property. Remediation activities involved extensive soil removal and installation of numerous wells, including bedrock wells. Specialized hydrogeological analysis was required to obtain closure of this case through negotiations with NJDEP.

Other professional assignments include the following:

- Supervising preliminary assessments, site and remedial investigations
- Supervising well drilling and installation activities
- Performing and interpreting hydraulic tests, such as pump tests, slug tests, and in-well testing in porous and fractured bedrock aquifers
- Interpretation of site data in order to develop a conceptual site model and in order to evaluate the most cost effective and efficient remedial action
- Preparing Site and Remedial Investigation Reports, and Remedial Action Workplans

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SUMMARY OF OTHER PROFESSIONAL EXPERIENCE

New Jersey Department of Environmental Protection **1986-1989**
Bureau of Environmental Measurements and Quality Assurance
Trenton, New Jersey

Principal Environmental Specialist

Performed technical reviews of CERCLA, RCRA, and ECRA site-specific work plans. Directed and monitored contractors' sampling and well installation procedures. Made site-specific field decisions and recommended alternative sampling approaches. Coordinated the collection of environmental samples to assess conditions at various hazardous waste sites.

Colgate-Palmolive Company **1983-1986**
Research and Development Center
Piscataway, New Jersey

Chemist

Developed new and cost effective methods to analyze raw materials and final products for the competitive consumer market.

PROFESSIONAL ORGANIZATIONS

Association of Ground Water Scientists and Engineers

Association of Engineering Geologists, Past President

Geological Association of New Jersey

American Chemical Society

COURSES COMPLETED

Princeton Course, "Ground Water Pollution and Hydrology"

NGWA's, "Treatment Technology for Contaminated Ground Water"

NGWA's, "Analysis and Design of Aquifer Tests"

NGWA's, "Environmental Forensics: Methods and Applications"

NGWA's, "Site Characterization in Support of Fractured Rock Remediation Projects"

Rutgers', "Ground Water Modeling Using Visual MODFLOW"

GSA's, "Methods of Characterizing Fluid Movement and Chemical Transport in Fractured Rock"

PCPG's "Geophysical Well Logging Seminar"

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PUBLICATIONS AND SPEAKING ENGAGEMENTS

Britton, R. "Biodegradation of a MEK Ground Water Plume over a Nine-Year Period." 24th Annual International Conference on Soils, Sediments and Water, October 20-23, 2008. University of Massachusetts, Amherst.

Britton, R., et al. "Innovative Technologies for Site Remediation." Office of Continuing Professional Education, Cook College, Rutgers University, December 8, 2008; December 14, 2007; and, December 6, 2006.

Britton, R. "Using the Abiotic Transformation Rate of 1,1,1-Trichloroethane to Estimate the Date of Discharge." 22nd Annual International Conference on Soils, Sediments and Water, October 16-19, 2006. University of Massachusetts, Amherst.

Michalski, A., R. Britton. "Groundwater in Fractured Bedrock: Concepts, Characterization & Remediation." Office of Continuing Professional Education, Cook College, Rutgers University, April 2, 2009; April 3, 2008; April 12, 2007; March 21, 2006; April 13, 2005; and, April 1, 2004.

Britton, R. "Ground Water Remediation Technologies." Presented at "Leaking Underground Storage Tanks in New Jersey." Lorman Education Services, Parsippany, New Jersey, May 29, 2003.

Britton, R., P. Kakarla, J. Brudereck. "Sequential Treatment of Chlorinated Alkanes Using an In Situ Modified Fenton's Process." Second International Conference on Oxidation and Reduction Technologies, November 17-21, 2002. Toronto, Canada.

Brudereck, J., R. Britton, T. Gerber, C. Blake. "Minimizing Injection Points and Maximizing Delivery of Oxidants for Dry Cleaning Remediation." 18th Annual Contaminated Soils, Sediments and Water Conference, October 21-24, 2002. Amherst, Massachusetts.

Britton, R., P. Kakarla, J. Brudereck. "In Situ Oxidation of Chlorinated Organic Compounds Using a Modified Fenton's Process." 34th Mid-Atlantic Industrial & Hazardous Waste Conference, September 20-21, 2002. New Brunswick, New Jersey.

Britton, R. "Innovative Technology Options." Presented at "Brownfields Redevelopment – A New Jersey Opportunity." Office of Continuing Professional Education, Cook College, Rutgers University, June 26, 2002.

Britton, R. "Conceptual Flow Models in the Passaic Formation." Presented at Rutgers University Ground Water Modeling Class (Dr. Yin Fan Reinfelder). December 4, 2001.

Britton, R., C. Coffee, and J. Brudereck. "Potential Cross-Contamination of a Leaky Multi-Unit Bedrock Aquifer System Following Routine Sampling Protocols." Proceedings of Fractured Rock 2001, March 26-28, 2001. Toronto, Canada.

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Britton, R. "Remedial Technologies & Limitations." Presented at New Jersey Water Environment Association Technology Transfer Seminar. March 8, 2000

Michalski, A., R. Britton, "The Role of Bedding Plane Partings in the Hydrogeology of Sedimentary Bedrock – Evidence from the Newark Basin, New Jersey." Ground Water, March-April 1997.

Britton, R., I. Whitman. "New Jersey's ISRA Law Sets Tone for Industrial Cleanups in '90s." Industrial Wastewater, May/June 1994.

Michalski, A., R. Britton and A.H. Uminski. "Integrated Use of Multiple Techniques for Contaminated Investigations in Fractured Aquifers: A Case from Newark Basin, New Jersey." Proceedings of NGWA Focus Eastern Conference, October 13-15, 1992. Boston, MA. Published by NGWA

Michalski, A., R. Britton and A.H. Uminski. "Bedrock Hydrogeology of the Manville-Bridgewater Section of the Raritan River Valley." Environmental Geology of the Raritan River Basin. Ninth Annual Meeting of the Geology Association of New Jersey, Somerset, New Jersey. October 30-31, 1992.