STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

DOCKET NO. 424 - The Connecticut Light & Power Company Application for a Certificate of Environmental Compatibility and Public Need for the Connecticut Portion of the Interstate Reliability Project that traverses the municipalities of Lebanon, Columbia, Coventry, Mansfield, Chaplin, Hampton, Brooklyn, Pomfret, Killingly, Putnam, Thompson, and Windham, which consists of (a) new overhead 345-kV electric transmission lines and associated facilities extending between CL&P's Card Street Substation in the Town of Lebanon, Lake Road Switching Station in the Town of Killingly, and the Connecticut/Rhode Island border in the Town of Thompson; and (b) related additions at CL&P's existing Card Street Substation, Lake Road Switching Station, and Killingly Substation.	**Docket No. 424** **May 21, 2012**

Resumes of CL&P Witnesses Filing Direct Testimony
and Potential Additional Witnesses

1. William H. Bailey, Ph.D.
2. Timothy B. Barton
3. Jeffrey Buckley, P.E.
4. Jonathan E. Busby, P.E.
5. Robert E. Carberry
6. John C. Case
7. Kenneth Collison
8. Christopher Fritz
9. R. Michael Hatfield
10. Anthony W. Johnson, III
11. Timothy F. Laskowski
12. Louise F. Mango
13. Jeffrey R. Martin
14. Anthony P. Mele
15. Judah L. Rose
16. Allen William Scarfone, P.E.
17. Maria Fusco Scheller
18. Troy Alan K. Tanaka, E.I.T.
19. Roger C. Zaklukiewicz

TAB 1
William H. Bailey, Ph.D.

Exponent

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William H. Bailey, Ph.D.
Principal Scientist

Professional Profile

Dr. William H. Bailey is a Principal Scientist in Exponent's Health Sciences practice. Dr. Bailey specializes in applying state-of-the-art assessment methods to environmental and occupational health issues. His 30 years of training and experience include laboratory and epidemiologic research, health risk assessment, and comprehensive exposure analysis. Dr. Bailey has investigated exposures to alternating current, direct current, and radiofrequency electromagnetic fields, 'stray voltage', and electrical shock, as well as to a variety of chemical agents and air pollutants. He is particularly well known for his research on potential health effects of electromagnetic fields and has served as an advisor to numerous state, federal, and international agencies. Currently, he is involved in research on exposures to marine life from submarine cables and respiratory exposures to ultrafine- and nanoparticles. Dr. Bailey is a visiting scientist at the Cornell University Medical College and has lectured at Rutgers University, the University of Texas (San Antonio), and the Harvard School of Public Health. He was formerly Head of the Laboratory of Neuropharmacology and Environmental Toxicology at the New York State Institute for Basic Research, Staten Island, New York, and an Assistant Professor and NIH postdoctoral fellow in Neurochemistry at The Rockefeller University in New York.

Academic Credentials and Professional Honors

Ph.D., Neuropsychology, City University of New York, 1975
M.B.A., University of Chicago, 1969
B.A., Dartmouth College, 1966

Sigma Xi; The Institute of Electrical and Electronics Engineers/International Committee on Electromagnetic Safety (Subcommitee 3, Safety Levels with Respect to Human Exposure to Fields (0 to –3 kHz) and Subcommittee 4, Safety Levels with Respect to Human Exposure to Radiofrequency Fields (3 kHz to 3 GHz); Elected member of the Committee on Man and Radiation (COMAR) of the IEEE Engineering in Medicine and Biology Society, 1998–2001

Publications

Bailey WH, Johnson GB, Bishop J, Hetrick T, Su S. Measurements of charged aerosols near ±500 kV DC transmission lines and in other environments. IEEE Transactions on Power Delivery 2012:27:371-379.

Kavet R, Bailey WH, Bracken TD, Patterson RM. Recent advances in research relevant to electric and magnetic field exposure guidelines. Bioelectromagnetics 2008; 29:499–526.

Bailey WH, Wagner M. IARC evaluation of ELF magnetic fields: Public understanding of the 0.4μT exposure metric. Journal of Exposure Science and Environmental Epidemiology 2008; 18:233–235.

Bailey WH, Erdreich L. Accounting for human variability and sensitivity in setting standards for electromagnetic fields. Health Physics 2007; 92:649–657.

Bailey WH, Nyenhuis JA. Thresholds for 60-Hz magnetic field stimulation of peripheral nerves in human subjects. Bioelectromagnetics 2005; 26:462–468.

Bracken TD, Senior RS, Bailey WH. DC electric fields from corona-generated space charge near AC transmission lines. IEEE Transactions on Power Delivery 2005; 20:1692–1702.

Bailey WH. Dealing with uncertainty in formulating occupational and public exposure limits. Health Physics 2002; 83:402–408.

Bailey WH. Health effects relevant to the setting of EMF exposure limits. Health Physics 2002; 83:376–386.

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Bailey WH. ICNIRP recommendation for limiting public exposure to 4 Hz–1 kHz electric and magnetic fields. Health Physics1999; 77:97–98.

Bailey WH. Principles of risk assessment with application to current EMF risk communication issues. In: EMF Risk Perception and Communication. Repacholi MH, Muc AM (eds), World Health Organization, Geneva, 1999.

De Santo RS, Bailey WH. Environmental justice tools and assessment practices. Proceedings, American Public Transit Association, 1999.

Bailey WH, Su SH, Bracken TD. Probabilistic approach to ranking sources of uncertainty in ELF magnetic field exposure limits. Health Physics 1999; 77:282–290.

Bailey WH. Field parameters. Proceedings, EMF Engineering Review Symposium, Status and Summary of EMF Engineering Research. Bracken TD and Montgomery JH (eds), Oak Ridge National Laboratory, Oak Ridge, TN, April 28–29, 1998.

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Bailey WH. Probabilistic approaches to deriving risk-based exposure guidelines: Application to extremely low frequency magnetic fields. In: Non-Ionising Radiation. Dennis JA and Stather JW (eds), Special Issue of Radiation Protection Dosimetry 1997; 72:327–336.

Bailey WH, Su SH, Bracken TD, Kavet R. Summary and evaluation of guidelines for occupational exposure to power frequency electric and magnetic fields. Health Physics 1997; 73:433–453.

Bracken TD, Senior RS, Rankin RF, Bailey WH, Kavet R. Magnetic field exposures in the electric utility industry relevant to occupational guideline levels. Applied Occupational and Environmental Hygiene 1997; 12:756–768.

Blondin J-P, Nguyen D-H, Sbeghen J, Goulet D, Cardinal C, Maruvada P-S, Plante M, and Bailey WH. Human perception of electric fields and ion currents associated with high voltage DC transmission lines. Bioelectromagnetics 1996; 17:230–241.

Bailey WH, Charry JM. Acute exposure of rats to air ions: Effects on the regional concentration and utilization of serotonin in brain. Bioelectromagnetics 1987; 8:173–181.

Bailey WH, Charry JM. Measurement of neurotransmitter release and utilization in selected brain regions of rats exposed to dc electric fields and atmospheric space charge. Proceedings, 23rd Hanford Life Sciences Symposium, Interaction of Biological Systems with Static and ELF Electric and Magnetic Fields, 1987.

Pavildes C, Aoki C, Chen J-S, Bailey WH, Winson J. Differential glucose utilization in the parafascicular region during slow-wave sleep, the still-alert state and locomotion. Brain Research 1987; 423:399–402.

Bailey WH, Charry JM. Behavioral monitoring of rats during exposure to air ions and DC electric fields. Bioelectromagnetics 1986; 7:329–339.

Charry JM, Shapiro MH, Bailey WH, Weiss JM. Ion-exposure chambers for small animals. Bioelectromagnetics 1986; 7:1–11.

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Gross SS, Levi R, Bailey WH, Chenouda AA. Histamine modulation of cardiac sympathetic responses: A physiological role. Federation Proceedings 1984; 43:458.

Gross SS, Guo ZG, Levi R, Bailey WH, Chenouda AA. 1984. Release of histamine by sympathetic nerve stimulation in the guinea pig heart and modulation of adrenergic responses. Circulation Research 1984; 54:516–526.

Dahl D, Bailey WH, Winson J. Effect of norepinephrine depletion of hippocampus on neuronal transmission from perforant pathway through dentate gyrus. Journal of Neurophysiology 1983; 49:123–135.

Guo ZG, Gross SS, Levi R, Bailey WH. Histamine: Modulation of norepinephrine release from sympathetic nerves in guinea pig heart. Federation Proceedings 1983; 42:907.

Bailey WH. Biological effects of air ions on serotonin metabolism: Fact and fancy. pp. 90–120. In: Conference on Environmental Ions and Related Biological Effects. Charry JM (ed), American Institute of Medical Climatology, Philadelphia, PA, 1982.

Weiss JM, Goodman PA, Losito BG, Corrigan S, Charry JM, Bailey WH. Behavioral depression produced by an uncontrollable stressor: Relationship to norepinephrine, dopamine, and serotonin levels in various regions of rat brain. Brain Research Reviews 1981; 3:167–205.

Bailey WH. Ion-exchange chromatography of creatine kinase isoenzymes: A method with improved specificity and sensitivity. Biochemical Medicine 1980; 24:300–313.

Bailey WH, Weiss JM. Evaluation of a 'memory deficit' in vasopressin-deficient rats. Brain Research 1979; 162:174–178.

Bailey WH, Weiss JM. Effect of ACTH 4-10 on passive avoidance of rats lacking vasopressin (Brattleboro strain). Hormones and Behavior 1978; 10:22–29.

Pohorecky LA, Newman B, Sun J, Bailey WH. Acute and chronic ethanol injection and serotonin metabolism in rat brain. Journal of Pharmacology and Experimental Therapeutics 1978; 204:424–432.

Koh SD, Vernon M, Bailey WH. Free-recall learning of word lists by prelingual deaf subjects. Journal of Verbal Learning and Verbal Behavior 1971; 10:542–574.

Book Chapters

Bailey WH. Principles of risk assessment and their limitations. In: Risk Perception, Risk Communication and its Application to EMF Exposure. Matthes R, Bernhardt JH, Repacholi MH (eds), International Commission on Non-Ionizing Radiation Protection, Oberschleißheim, Germany, 1998.

Bailey WH. Biological responses to air ions: Is there a role for serotonin? pp. 151–160. In: Air Ions: Physical and Biological Aspects. Charry JM and Kavet R (eds), CRC Press, Boca Raton, FL, 1987.

Weiss JM, Bailey WH, Goodman PA, Hoffman LJ, Ambrose MJ, Salman S, Charry JM. A model for neurochemical study of depression. pp. 195–223. In: Behavioral Models and the Analysis of Drug Action. Spiegelstein MY, Levy A (eds), Elsevier Scientific, Amsterdam, 1982.

Bailey WH. Mnemonic significance of neurohypophyseal peptides. pp. 787–804. In: Changing Concepts of the Nervous System. Morrison AR, Strick PL (eds), Academic Press, New York, NY, 1981.

Bailey WH, Weiss, JM. Avoidance conditioning and endocrine function in Brattleboro rats. Pp 371–395. In: Endogenous Peptides and Learning and Memory Process. Martinez JL, Jensen RA, Messing RB, Rigter H, McGaugh JL (eds), Academic Press, New York, NY, 1981.

Weiss JM, Glazer H, Pohorecky LA, Bailey WH, Schneider L. Coping behavior and stress-induced behavioral depression: Studies of the role of brain catecholamines. pp. 125–160. In: The Psychobiology of the Depressive Disorders: Implications for the Effects of Stress. Depue R (ed), Academic Press, New York, NY, 1979.

Technical Reports

Jardini JA, et al. Electric field and ion current environment of HVDC overhead transmission lines. Report of Joint Working Group B4/C3/B2.50, CIGRÉ, August 2011.

Johnson GB, Bracken TD, Bailey WH. Charging and transport of aerosols near AC transmission lines: A literature review. EPRI, Palo Alto, CA, 2003.

Bailey WH. Probabilistic approach to ranking sources of uncertainty in ELF magnetic-field exposure limits. In: Evaluation of Occupational Magnetic Exposure Guidelines, Interim Report, EPRI Report TR-111501, 1998.

Bracken TD, Bailey WH, Su SH, Senior RS, Rankin RF. Evaluation of occupational magnetic-field exposure guidelines; Interim Report. EPRI Report TR-108113, 1997.

Bailey WH, Weil DE, Stewart JR. HVDC Power Transmission Environmental Issues Review. Oak Ridge National Laboratory, Oak Ridge, TN, 1996.

Bailey WH. Melatonin responses to EMF. Proceedings, Health Implications of EMF Neural Effects Workshop, Report TR-104327s, EPRI, 1994.

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Bailey WH, Bissell M, Brambl RM, Dorn CR, Hoppel WA, Sheppard AR, Stebbings JH. A health and safety evaluation of the +/- 400 KV powerline. Science Advisor's Report to the Minnesota Environmental Quality Board, 1982.

Charry JM, Bailey WH, Weiss JM. Critical annotated bibliographical review of air ion effects on biology and behavior. Rockefeller University, New York, NY, 1982.

Bailey WH. Avoidance behavior in rats with hereditary hypothalamic diabetes insipidus. Dissertation, City University of New York, 1975.

Selected Invited Presentations

Bailey WH, Erdreich LS. Human sensitivity and variability in response to electromagnetic fields: Implications for standard setting. International Workshop on EMF Dosimetry and Biophysical Aspects Relevant to Setting Exposure Guidelines. International Commission on Non-Ionizing Radiation Protection, Berlin, March 2006.

Bailey WH. Research-based approach to setting electric and magnetic field exposure guidelines (0-3000 Hz). IEEE Committee on Electromagnetic Safety, December 2005.

Bailey WH. Conference Keynote Presentation. Research supporting 50/60 Hz electric and magnetic field exposure guidelines. Canadian Radiation Protection Association, Annual Conference, Winnipeg, June 2005.

Bailey WH. Scientific methodology for assessing public health issues: A case study of EMF. Canadian Radiation Protection Association, Annual Conference, Public Information for Teachers, Winnipeg, June 2005.

Bailey WH. Assessment of potential environmental effects of electromagnetic fields from submarine cables. Connecticut Academy of Science and Engineering, Long Island Sound Bottomlands Symposium: Study of Benthic Habitats, July 2004.

De Santo RS, Coe M, Bailey WH. Environmental justice assessment and the use of GIS tools and methods. National Association of Environmental Professionals, 27th Annual Conference, Dearborn, MI, June 2002.

Bailey WH. Applications to enhance safety: Research to understand and control potential risks. Human Factors and Safety Research, Volpe National Transportation Systems Center/Dutch Ministry of Transport, Cambridge, MA, November 2000.

Bailey WH. EMF health effects review. EMF Exposure Guideline Workshop, Brussels Belgium, June 2000.

Bailey WH. Dealing with uncertainty when formulating guidelines. EMF Exposure Guideline Workshop, Brussels Belgium, June 2000.

Bailey WH. Field parameters: Policy implications. EMF Engineering Review Symposium, Status and Summary of EMF Engineering Research, Charleston, SC, April 1998.

Bailey WH. Principles of risk assessment: Application to current issues. Symposium on EMF Risk Perception and Communication, World Health Organization, Ottawa, Canada, August 1998.

Bailey WH. Current guidelines for occupational exposure to power frequency magnetic fields. EPRI EMF Seminar, New Research Horizons, March 1997.

Bailey WH. Methods to assess potential health risks of cell telephone electromagnetic fields. IBC Conference—Cell Telephones: Is there a Health Risk? Washington, DC, June 1997.

Bailey WH. Principles of risk assessment and their limitations. Symposium on Risk Perception, Risk Communication and its Application to EMF Exposure, International Commission on Non-Ionizing Radiation Protection, Vienna, Austria, October 1997.

Bailey WH. Probabilistic approach for setting guidelines to limit induction effects. IEEE Standards Coordinating Committee 28: Non-Ionizing Radiation, Subcommittee 3 (0–3 kHz), June 1997.

Bailey WH. Power frequency field exposure guidelines. IEEE Standards Coordinating Committee 28: Non-Ionizing Radiation, Subcommittee 3 (0–3 kHz), June 1996.

Bailey WH. Epidemiology and experimental studies. American Industrial Hygiene Conference, Washington, DC, May 1996.

Bailey WH. Review of 60 Hz epidemiology studies. EMF Workshop, Canadian Radiation Protection Association, Ontario, Canada, June 1993.

Bailey WH. Biological and health research on electric and magnetic fields. American Industrial Hygiene Association, Fredrickton, New Brunswick, Canada, October 1992.

Bailey WH. Electromagnetic fields and health. Institute of Electrical and Electronics Engineers, Bethlehem, PA, January 1992.

Bailey WH, Weiss JM. Psychological factors in experimental heart pathology. Visiting Scholar Presentation, National Heart Lung and Blood Institute, March 1977.

Presentations

Shkolnikov Y, Bailey WH. Electromagnetic interference and exposure from household wireless networks. Product Safety Engineering Society Meeting, San Diego, CA October 2011.

Nestler E, Trichas T, Pembroke A, Bailey W. Will undersea power cables from offshore wind projects affect sharks? North American Offshore Wind Conference & Exhibition, Atlantic City, NJ, October 2010.

Nestler E, Pembroke A, Bailey W. Effects of EMFs from undersea power lines on marine species. Energy Ocean International, Ft. Lauderdale, FL, June 2010.

Pembroke A, Bailey W. Effects of EMFs from undersea power cables on elasmobranchs and other marine species. Windpower 2010 Conference and Exhibition, Dallas, TX, 2010.

Bailey WH. Clarifying the neurological basis for ELF guidelines. Workshop on Practical Implementation of ELF and RF Guidelines. The Bioelectromagnetics Society 29th Annual Meeting, Kanazawa, Japan, June 2007.

Sun B, Urban B, Bailey W. AERMOD simulation of near-field dispersion of natural gas plume from accidental pipeline rupture. Air and Waste Management Association: Health Environments: Rebirth and Renewal, New Orleans, LA, June 2006.

Bailey WH, Johnson G, Bracken TD. Method for measuring charge on aerosol particles near AC transmission lines. Joint Meeting of The Biolectromagnetics Society and The European BioElectromagnetics Association, Dublin Ireland, June 2005.

Bailey WH, Bracken TD, Senior RS. Long-term monitoring of static electric field and space charge near AC transmission Lines. The Bioelectromagnetics Society, 26th Annual Meeting, Washington, DC, June 2004.

Bailey WH, Erdreich L, Waller L, Mariano K. Childhood leukemia in relation to 25-Hz and 60-Hz magnetic fields along the Washington DC—Boston rail line. Society for Epidemiologic Research, 35th Annual Meeting, Palm Desert CA, June 2002. American Journal of Epidemiology 2002; 155:S38.

Erdreich L, Klauenberg BJ, Bailey WH, Murphy MR. Comparing radiofrequency standards around the world. Health Physics Society 43rd Annual Meeting, Minneapolis, MN, July 1998.

Bracken TD, Senior RS, Rankin RF, Bailey WH, Kavet R. Relevance of occupational guidelines to utility worker magnetic-field exposures. Second World Congress for Electricity and Magnetism in Biology and Medicine, Bologna, Italy, June 1997.

Weil DE, Erdreich LS, Bailey WH. Are 60-Hz magnetic fields cancer causing agents? Mechanisms and Prevention of Environmentally Caused Cancers, The Lovelace Institutes 1995 Annual Symposium, La Fonda, Santa Fe, NM, October 1995.

Bailey WH. Neurobiological research on extremely-low-frequency electric and magnetic fields: A review to guide future research. Sixteenth Annual Meeting of the Bioelectromagnetics Society, Copenhagen, Denmark, June 1994.

Blondin J-P, Nguyen D-H, Sbeghen J, Maruvada PS, Plante M, Bailey WH, Goulet D. The perception of DC electric fields and ion currents in human observers. Annual Meeting of the Canadian Psychological Association, Penticton, British Columbia, Canada, June 1994.

Erdreich LS, Bailey WH, Weil DE. Science, standards and public policy challenges for ELF fields. American Public Health Association 122nd Annual Meeting, Washington, DC, October 1994.

Bailey WH, Charry JM. Particle deposition on simulated VDT operators: Influence of DC electric fields. 10^{th} Annual Meeting of the Bioelectromagnetics Society, June 1988.

Charry JM, Bailey WH. Contribution of charge on VDTs and simulated VDT operators to DC electric fields at facial surfaces. 10^{th} Annual Meeting of the Bioelectromagnetics Society, June 1988.

Bailey WH, Charry, JM. Dosimetric response of rats to small air ions: Importance of relative humidity. EPRI/DOE Contractors Review, November 1986. Charry JM, Bailey WH, Bracken TD (eds). DC electric fields, air ions and respirable particulate levels in proximity to VDTs. International Conference on VDTs and Health, Stockholm, Sweden, June 12–15 1986.

Charry JM, Bailey WH. Air ion and DC field strengths at 10^4 ions/cm^3 in the Rockefeller University Small Animal Exposure Chambers. EPRI/DOE Contractors Review, November 1985.

Charry JM, Bailey WH. DC Electrical environment in proximity to VDTs. 7th Annual Meeting of the Bioelectromagnetics Society, June 1985.

Bailey WH, Collins RL, Lahita RG. Cerebral lateralization: Association with serum antibodies to DNA in selected bred mouse lines. Society for Neuroscience, 1985.

Kavet R, Bailey WH, Charry JM. Respiratory neuroendocrine cells: A plausible site for air ion effects. Seventh Annual Meeting of The Bioelectromagnetics Society, June 1985.

Bailey WH, Charry JM. Measurement of neurotransmitter release and utilization in selected brain regions of rats exposed to DC electric fields and atmospheric space charge. 23rd Hanford Life Sciences Symposium, Richland, WA, October 1984.

Bailey WH, Charry JM, Weiss JM, Cardle K, Shapiro M. Regional analysis of biogenic amine turnover in rat brain after exposure to electrically charged air molecules (air ions). Society for Neuroscience, 1983.

Bailey WH. Biological effects of air ions: Fact and fancy. American Institute of Medical Climatology Conference on Environmental Ions and Related Biological Effects, October 1982.

Goodman PA, Weiss JM, Hoffman LJ, Ambrose MJ, Bailey WH, Charry, JM. Reversal of behavioral depression by infusion of an A2 adrenergic agonist into the locus coeruleus. Society for Neuroscience, November 1982.

Charry JM, Bailey WH. Biochemical and behavioral effects of small air ions. Electric Power Research Institute Workshop, April 1981.

Bailey WH, Alsonso DR, Weiss JM, Chin S. Predictability: A psychologic/ behavioral variable affecting stress-induced myocardial pathology in the rat. Society for Neuroscience, November 1980.

Salman SL, Weiss JM, Bailey WH, Joh TH. Relationship between endogenous brain tyrosine hydroxylase and social behavior of rats. Society of Neuroscience, November 1980.

Bailey WH, Maclusky S. Appearance of creatine kinase isoenzymes in rat plasma following myocardial injury produced by isoproterenol. Fed Assoc Soc Exp Biol, April 1978.

Bailey WH, Maclusky S. Appearance of creatine kinase isoenzymes in rat plasma following myocardial injury by isoproterenol. Fed Proc 1978; 37:889.

Bailey WH, Weiss JM. Effect of ACTH 4-10 on passive avoidance of rats lacking vasopressin (Brattleboro strain). Eastern Psychological Association, April 1976.

Prior Experience

President, Bailey Research Associates, Inc., 1991–2000
Vice President, Environmental Research Information, Inc., 1987–1990
Head of Laboratory of Environmental Toxicology and Neuropharmacology, New York State Institute for Basic Research, 1983–1987
Assistant Professor, The Rockefeller University, 1976–1983

Academic Appointment

- Visiting Fellow, Department of Pharmacology, Cornell University Medical College, New York, NY, 1986–present

Prior Academic Appointments

- Visiting Scientist, The Jackson Laboratory, Bar Harbor, ME, 1984–1985
- Head, Laboratory of Neuropharmacology and Environmental Toxicology, NYS Institute for Basic Research in Developmental Disabilities, Staten Island, NY, 1983–1987
- Assistant Professor, The Rockefeller University, New York, NY, 1976–1983
- Postdoctoral Fellow, Neurochemistry, The Rockefeller University, New York, NY, 1974–1976
- Dissertation Research, The Rockefeller University, New York, NY, 1972–1974
- CUNY Research Fellow, Dept. of Psychology, Queens College, City University of New York, Flushing, NY, 1969–1971
- Clinical Research Assistant, Department of Psychiatry, University of Chicago; Psychiatric Psychosomatic Inst., Michael Reese Hospital, and Illinois State Psychiatric Inst, Chicago, IL, 1968–1969

Teaching Appointments

- Lecturer, University of Texas Health Science Center, Center for Environmental Radiation Toxicology, San Antonio, TX, 1998
- Lecturer, Harvard School of Public Health, Office of Continuing Education, Boston, MA, 1995, 1997
- Lecturer, Rutgers University, Office of Continuing Education, New Brunswick, NJ, 1991–1995
- Adjunct Assistant Professor, Queens College, CUNY, Flushing, NY, 1978
- Lecturer, Queens College, CUNY, Flushing, NY, 1969–1974

Editorship

- Associate Editor, Non-Ionizing Radiation, *Health Physics*, 1996–present

Advisory Positions

- ZonMw – Netherlands Organization for Health Research and Development, 2012; 2007-2008, reviewer for National Programme on EMF and Health
- US Bureau of Ocean Energy Management, Regulation and Enforcement, 2009–2010
- Canadian National Collaborating Centre for Environmental Health, reviewer of Centre reports, 2008
- Island Regulatory and Appeals Commission, province of Prince Edward Island, Canada, 2008

- National Institute of Environmental Health Sciences/ National Institutes of Health, Review Committee, Neurotoxicology, Superfund Hazardous Substances Basic Research and Training Program, 2004
- National Institute of Environmental Health Sciences, Review Committee Role of Air Pollutants in Cardiovascular Disease, 2004
- Working Group on Non-Ionizing Radiation, Static and Extremely Low-Frequency Electromagnetic Fields, International Agency for Research on Cancer, 2000–2002
- Working Group, EMF Risk Perception and Communication, World Health Organization, 1998–2005
- Member, International Committee on Electromagnetic Safety, Subcommittee 3 - Safety Levels with Respect to Human Exposure to Fields (0 to 3 kHz) and Subcommitee 4 - Safety Levels with Respect to Human Exposure (3kHz to 3GHz) Institute of Electrical and Electronics Engineers (IEEE), 1996–present
- Invited participant, National Institute of Environmental Health Sciences EMF Science Review Symposium: Clinical and In Vivo Laboratory Findings, 1998
- Working Group, EMF Risk Perception and Communication, International Commission on Non-Ionizing Radiation Protection, 1997
- U.S. Department of Energy, RAPID EMF Engineering Review, 1997
- Oak Ridge National Laboratory, 1996
- American Arbitration Association International Center for Dispute Resolution, 1995–1996
- U.S. Department of Energy, 1995
- National Institute for Occupational Safety and Health, 1994–1995
- Federal Rail Administration, 1993–1996
- U.S. Forest Service, 1993
- New York State Department of Environmental Conservation, 1993
- National Science Foundation
- National Institutes of Health, Special Study Section—Electromagnetics, 1991–1993
- Maryland Public Service Commission and Maryland Department of Natural Resources, Scientific Advisor on health issues pertaining to HVAC Transmission Lines, 1988–1989
- Scientific advisor on biological aspects of electromagnetic fields, Electric Power Research Institute, Palo Alto, CA, 1985–1989
- U.S. Public Health Service, NIMH: Psychopharmacology and Neuropsychology Review Committee, 1984
- Consultant on biochemical analysis, Colgan Institute of Nutritional Science, Carlsbad, CA, 1982–1983
- Behavioral Medicine Abstracts, Editor, animal behavior and physiology, 1981–1983
- Consultant on biological and behavioral effects of high-voltage DC transmission lines, Vermont Department of Public Service, Montpelier, VT, 1981–1982

- Scientific advisory committee on health and safety effects of a high-voltage DC transmission line, Minnesota Environmental Quality Board, St. Paul, MN, 1981–1982
- Consultant on biochemical diagnostics, Biokinetix Corp., Stamford, CT, 1978–1980

Professional Affiliations

- The Health Physics Society (Affiliate of the International Radiation Protection Society)
- Society for Risk Analysis
- International Society of Exposure Analysis
- New York Academy of Sciences
- American Association for the Advancement of Science
- Air and Waste Management Association
- Society for Neuroscience/International Brain Research Organization
- Bioelectromagnetics Society
- The Institute of Electrical and Electronics Engineers/Engineering in Medicine and Biology Society
- Conseil International des Grands Reseaux Electriques

TAB 2
Timothy B. Barton

Timothy B. Barton

Siting and Routing Management

Expertise

- Client Coordination
- Project Management
- Environmental Analysis
- Expert Testimony
- Land-Use Studies
- Aquatic Biology
- Wildlife Biology
- GIS Development
- GPS Surveys

Education

- B.S. in Environmental Science, University of Kansas, 1994

Organizations

- Geospatial Information and Technology Association (GITA) – Midwest Chapter Executive Board

Total Years of Experience

17

Years With Burns & McDonnell

17

Start Date

July 1, 1994

Mr. Barton is a senior environmental specialist at Burns & McDonnell. He has participated in various projects including land use assessment, aquatic invertebrate identification and environmental assessment. His responsibilities have included department management, project management, fieldwork, laboratory analysis, data collection and report preparation. He also uses ESRI Geographic Information System (GIS) ArcGIS software to review environmental constraints for various projects. He has a broad range of knowledge in working with GIS data and is good at incorporating its use into projects. In addition, he is a Division project administrator for Burns & McDonnell's Oracle based Management Information System (MIS). As an administrator he is responsible for reviewing and approving new projects entered into the system as well as revisions to existing projects. He also provides MIS training and support to the Division.

Interstate Reliability Project – 345-kV Transmission Line, Northeast Utilities System

Connecticut, 2009-Ongoing

For Northeast Utilities System (NUS), Mr. Barton is the project manager for the siting efforts associated with the Interstate Reliability Project (IRP). The IRP is a set of improvements to the electric transmission systems of The Connecticut Light and Power Company ("CL&P") in Connecticut and National Grid in in Rhode Island and Massachusetts. The project includes approximately 75 miles of new 345-kV transmission line and upgrades to three substations and three switching stations. For CL&P, he was responsible for review and route review of the Connecticut portion of IRP which includes approximately 37 miles of new 345-kV transmission line, predominantly within existing transmission line right-of-way. The Connecticut portion of the project also includes upgrades to Card Street, Lake Road and Killingly stations.

Burns & McDonnell is acting as the primary consultant providing preliminary engineering and design services and overall monitoring and project management of the Connecticut Siting Council (CSC). Burns & McDonnell is assisting CL&P and in the identification and evaluation of routes, development and participation in the public involvement process, the compilation of municipal recommendations, environmental permitting and the preparation of the CSC Certification of Environmental Compatibility and Public Need (CECPN).

Greater Springfield Reliability Project – 345-kV Transmission Line and 115-kV Transmission Line Upgrades, Northeast Utilities System

Connecticut and Massachusetts, 2007-Ongoing

For Northeast Utilities System (NUS), Mr. Barton is the project manager for the siting efforts associated with the Greater Springfield Reliability Project (GSRP). The GSRP is a set of improvements to the electric transmission systems of CL&P in Connecticut and Western Massachusetts Electric Company ("WMECO") in Massachusetts. The transmission line improvements include a new 345-kV transmission line, 115-kV transmission line upgrades and ancillary facilities associated with the project.

Burns & McDonnell is acting as the primary consultant providing preliminary engineering and design services and overall monitoring and project management of the CSC and Massachusetts Energy Facilities Siting Board (EFSB) regulatory processes. Burns & McDonnell is assisting CL&P and WMECO in the identification and evaluation of routes, development and participation in the public involvement process, the compilation of municipal recommendations, environmental permitting and the

preparation of the CSC CECPN and EFSB petition documents. To support this effort, Mr. Barton has provided expert testimony to both the CSC and EFSB.

Agawam to West Springfield Project – 115-kV Circuit Separation, Northeast Utilities System

Massachusetts, 2007-Ongoing

Also for NUS, Mr. Barton is the project manager for the Siting efforts associated with the Agawam to West Springfield Circuit Separation Project. The project is a separation of two circuits that are currently on a common set of lattice structures that are being separated onto monopoles as improvements to the electric transmission systems of Western Massachusetts Electric Company ("WMECO"). The transmission line improvements also include substation upgrades and an underground portion of one of the 115-kV circuits.

Burns & McDonnell is acting as the primary consultant providing preliminary engineering and design services and overall monitoring and project management of the and Massachusetts Department of Public Utilities (DPU) regulatory processes. Burns & McDonnell is assisted WMECO in the identification and evaluation of routes, development and participation in the public involvement process, the compilation of municipal recommendations, environmental permitting and the preparation of the DPU petition documents. To support this effort, Mr. Barton provided expert testimony to the DPU and the project is currently in operation.

Springfield Cables Project – Two 115-kV Underground Transmission Lines and Substation Upgrades, Northeast Utilities System

Massachusetts, 2007

Also for NUS, Mr. Barton was the project manager for the siting efforts associated with the Springfield Cables Project which included two new 115-kV underground transmission lines, a new switching station and upgrades at three substations. The Project primarily involved installation of two, solid dielectric underground cables between three substations in the City of Springfield as part of improvements to the electric transmission system for WMECO in Massachusetts. These improvements were needed to provide safe, reliable, and economic transmission service throughout the Springfield geographic area and to assure that that portion of the transmission system will comply with mandatory federal and regional reliability standards. Burns & McDonnell assisted WMECO in the identification and evaluation of routes, development and participation in the public involvement process, the compilation of municipal recommendations, and the preparation of the EFSB application documents.

Multiple underground route alternatives have been identified by Burns & McDonnell for consideration and evaluation. Routes along existing transmission, gas and rail corridors and public streets and highways were considered and evaluated for underground construction based on sound environmental, social and engineering factors typical for similar voltage lines in the region. Burns & McDonnell also identified appropriate locations for river crossings and determined necessary methods for the crossings to minimize impacts. Burns & McDonnell used GIS technology to identify and map constraints and analyze routes. The Project was cancelled after the EFSB petition was submitted.

Glenbrook Cables Project – 115-kV Underground Transmission Line and Substation Upgrades, Northeast Utilities System

Connecticut, 2005

Also for NUS, Mr. Barton was the project manager for the siting efforts associated with the Glenbrook Cables Project which included a new 115-kV underground transmission lines and upgrades at two substations. The Project primarily involved installation of solid dielectric underground cables between two substations in Fairfield County, Connecticut. Burns & McDonnell assisted CL&P in the identification and evaluation of routes, development and participation in the public involvement process, the compilation of municipal recommendations, and the preparation of the CSC application documents. Mr. Barton provided support and participated in the CSC hearings.

Multiple underground route alternatives were identified by Burns & McDonnell for consideration and evaluation. Routes along existing transmission, gas and rail corridors and public streets and highways were considered and evaluated for underground construction based on sound environmental, social and engineering factors typical for similar voltage lines in the region. Burns & McDonnell also identified appropriate locations for river crossings and determined necessary methods for the crossings to minimize impacts. Burns & McDonnell used GIS technology to identify and map constraints and analyze routes. The Project was approved by the CSC and is currently in operation.

Southern Reinforcement Project – 230-kV Underground Transmission Lines, PSE&G

New Jersey, 2011-Ongoing

For Public Service Electric and Gas Company (PSE&G), Mr. Barton is the routing manager for a proposed 230-kV underground transmission line project between Gloucester to Camden Substations and Gloucester to Cuthbert Boulevard to Camden Substations. An alternative routing analysis was completed for the project which included a desktop review using GIS of potential routes, field review to verify potential route segments and trenchless crossing locations, and route evaluation using an evaluation criteria matrix. The preferred route for the project is going through a detailed route survey to verify existing underground utilities.

Seminole to Muskogee Project – 345-kV Transmission Line, OG&E

Oklahoma, 2010-Ongoing

For Oklahoma Gas & Electric, Mr. Barton was the routing manager for a proposed 345-kV transmission line project between Seminole and Muskogee Substations. The approximately 125-mile transmission line will be constructed primarily on new right-of-way and a routing analysis which included; development of a study area boundary, development and field review of route alternative, consultation with public officials, and route screening analysis. In addition, public open houses were held to discuss the proposed route alternatives with land owners in the vicinity of the potential routes. Following the public open houses, the routes were adjusted where appropriate to accommodate land owner comments. Right-of-way acquisition has been completed and the project is nearing the start of construction.

Sheboygan Falls Energy Facility, Sheboygan Power LLC

Sheboygan Falls, Wisconsin, 2002-2004

For Sheboygan Power LLC, Mr. Barton was the project manager for environmental services for a 530 MW simple-cycle gas-fired power plant in Sheboygan County, Wisconsin. Burns & McDonnell prepared the CPCN application and the associated

permits consisting of an air permit, high capacity well permit, WPDES construction storm water and operational storm water permit, industrial discharge permit, FAA/WDOT notifications and various state and local permits. To support the CPCN application, Burns & McDonnell staff conducted wetland and habitat surveys, a noise study, a cultural resources survey and multiple contacts with federal, state, county and local entities for information. Mr. Barton also provided expert testimony during the PSC's technical hearings. The project was approved by the PSC, constructed by Burns & McDonnell's Construction Group and subsequently sold to Alliant Energy and is currently in operation.

Joint Baseload Siting Study, Wisconsin Public Service Corporation and Wisconsin Power & Light

Wisconsin, 2004-2005

In a joint project with WPS and Wisconsin Power & Light (WPL), he was the project manager for environmental services associated with a joint baseload feasibility study for a potential power plant in Wisconsin. The project consisted of two main components, a siting study and a technology assessment. The siting study involved screening of various infrastructures such as proximity to electric transmission lines, railroads, gas pipelines and water. The project team developed a matrix of 44 screening criteria to analyze and rate each potential site. He developed a GIS to analyze the infrastructure and other environmental constraints to assist in the screening of the potential sites. The sites were then narrowed down to nine sites for field visits to review and verify environmental and other constraints associated with the sites. The technology assessment was conducted by Burns & McDonnell's Energy Group.

Siting Study, Alliant Energy – Interstate Power & Light

Iowa and Minnesota, 2005-2006

For Alliant Energy - Interstate Power & Light (IPL), Mr. Barton was the project manager for environmental services associated with a siting study which evaluated six brownfield sites in Iowa and Minnesota for baseload generation. The sites were evaluated for environmental and infrastructure constraints and a short-list of sites were visited to verify information reviewed during the desktop evaluation. A report documenting evaluation methodology and siting constraints was prepared and will be used to assist IPL in determining which sites to pursue for future generation needs.

TAB 3
Jeffrey Buckley, P.E.

Jeffrey Buckley, P.E.

Expertise
- Project Management

Education
Master of Civil Engineering (MCE), North Carolina State University, 2008

B.S. Civil Engineering, Northeastern University, 2000

Registration
Professional Engineer, State of Connecticut, License No. 24309

Professional Engineer, State of New York, License No. 083705

Organizations
American Society of Civil Engineers (ASCE)

Total Years of Experience
10+

Years With Burns & McDonnell
5

Mr. Buckley is a project manager in the Construction Design-Build division and has a wide range of engineering and construction experience from a variety of projects throughout the New England region.

He has completed projects associated with private development and public/government facilities, such as schools and universities, office buildings and commercial developments. Mr. Buckley is also experienced in the construction of roadways and bridges, parking garages, transmission line, and private residences.

His project management responsibilities have encompassed all project phases, from initial client contact and proposal writing, through planning and design, to completion of construction. Over the course of his career, Mr. Buckley has developed the ability to manage large-scale projects. His recent responsibilities as a project manager have been focused on large scale transmission line upgrade projects with specific attention to siting, permitting, land acquisition, field investigations, detailed design, procurement, construction management, cost control, schedule control and public relations.

A summary of Mr. Buckley's experience is provided below:

The New England East-West Solution Program
Project Manager
2008-Present
The NEEWS project consists of 100+ miles of 345-kV overhead transmission, 45+ miles of 115-kV overhead transmission and approximately 17 substation upgrades throughout Connecticut and Western Massachusetts. Mr. Buckley is the project manager of the Interstate Reliability Project (a portion of the overall NEEWS Project) which consists of 38 miles of 345-kV transmission line and three substation upgrades. His responsibilities as project manager include the management of siting and permitting, detailed design, cost control, schedule control, community relations, land acquisition, field investigations, procurement and construction inspection. The NEEWS project is a multibillion -dollar project with a construction window of approximately 2.5 years.

Middletown to Norwalk 345-kV Transmission Line Project
Northeast Utilities Service Company
Southwest Connecticut, 2006-2008
Mr. Buckley was a project engineer on the program management team for the construction of 69 miles of 345 kV transmission line between Middletown and Norwalk, CT. Mr. Buckley focused on the 24 mile long underground portion of the project, including cut and cover construction from Milford to Norwalk with railroad and watercourse crossing utilizing utility bridges, jack and bore techniques, and horizontal direction drilling. Prior to construction, focused on design, permitting and planning issues for the underground route, including managing subcontractors during the subsurface exploration phase, and reviewing design submissions and reports. Reviewed and submitted plans and reports to towns and government agencies. And revised design based on comments. During construction, worked with a team to manage the civil contractor and their efforts, reviewing costs, schedules, design submittals and RFI's. Coordinated the relocation of replacement of existing facilities in conflict with the transmission line construction.

Professional Service Industries, Inc. (PSI)
New London, CT, 2005 - 2006
Mr. Buckley served as project manager and performed managerial functions associated

with the geotechnical and construction phase services of the Navy Northeast Housing Privatization project in New London. Mr. Buckley acted as the primary client contact and technical resource, and advised the contractor and client on geotechnical and earthwork testing issues. Supervised a team of engineers, inspectors, and technicians who performed construction observation and testing for the project. Reviewed daily geotechnical field reports, and managed PSI's construction documentation. Oversaw soil and concrete laboratory personnel. Reviewed laboratory test procedures and results, checked compliance with project specifications, and submitted results to project team members. Issued marketing letters to prospective clients and worked to further the company presence in the region through the development of new business.

GeoDesign, Inc.
Middlebury, CT, 2000 - 2005
Mr. Buckley's responsibilities included:

- *Project Management:* Prepared proposals in response to client requests that defined the project scope and the proposed strategy, schedule, budget, and terms and conditions to meet client goals. Performed administrative functions for new projects such as obtaining the necessary insurance required by project standards, and securing necessary permitting with governing agencies. In addition, established project teams and allocated responsibilities and established documentation standards. Prepared and negotiated agreements with outside entities performing subcontractor work. Managed day to day geotechnical design and construction efforts, project schedules, and project budgets while ensuring client's goals were satisfied in accordance with their expectations.
- *Geotechnical Design:* Designed, coordinated, and executed subsurface exploration programs and evaluated subsurface conditions for various projects including schools and universities, office buildings and commercial developments, roadways and bridges, parking garages, railroad bridges, and private residences. Prepared numerous geotechnical engineering reports detailing the proposed projects, the associated subsurface exploration program and subsurface conditions encountered, geotechnical engineering analyses, and design and construction recommendations for various projects.
- *Hydrogeological Engineering:* Planned, budgeted, and oversaw subsurface exploration programs, including falling head and constant head testing, bedrock coring and observation well installation and monitoring. Summarized field data and historical precipitation data for use in MODFLOW models of groundwater flow and site hydrogeology to access the impact (groundwater mounding) of proposed onsite septic disposal systems on previously undeveloped sites within the New York City watershed. Prepared reports summarizing computer model results and recommendations concerning hydrogeologic implications of proposed site development.
- *Construction Testing and Observation:* Experienced with the installation and monitoring of construction instrumentation including vibratory wire inclinometers, piezometers, tiltmeters, observation wells, single and multi channel dataloggers, and vibration monitors. Familiar with the remote accessing/downloading of data, reduction of large data sets, and the summarization of field data for report and presentation purposes. Experienced with the observation and documenting of the following construction operations for conformance with plans and specifications: installation of drilled mini-pile, driven pile, pressure injected footings and drilled shaft foundations; excavation and backfill during earthwork operations; blasting and vibration monitoring; and test borings and test pits for subsurface investigations programs. Performed and oversaw verification testing of soil nails, rock anchors

and other tieback systems.

GZA GeoEnvironmental, Inc.
Newton, MA, 1999
Mr. Buckley served as Field Engineer at the Nyanza Superfund Site and was responsible for observing and documenting the excavation of contaminated soil from a wetlands area and the subsequent placement and compaction of the contaminated material in a landfill cell. Performed in-place density testing on the material in the landfill. Conducted air monitoring at the site, and collected soil and water samples for laboratory analysis. Oversaw an onsite soils laboratory, and performed a full spectrum of soil laboratory testing for the project on both granular and cohesive soils.

Kiewit Construction Company
Boston, MA, 1998-1999
Mr. Buckley served as Rebar Engineer for an underground tunnel section of the Boston Central Artery/Tunnel Project. His responsibilities included review of rebar shop drawings, and distribution of drawings and specifications concerning steel reinforcing for the project. Inspected in-place steel reinforcing bar prior to the placement of concrete for the tunnel section which connects travelers from Interstates I-90 and I-93 with Logan International Airport by way of the Ted Williams tunnel. Performed construction noise monitoring, and obtained construction wastewater samples for laboratory testing.

TAB 4
Jonathan E. Busby, P.E.

Jonathan E. Busby, P.E.

Expertise
- Underground Transmission Lines
- Substation Design
- Power Transformers

Education
- B.S. in Electrical Engineering, South Dakota School of Mines & Technology, 2000

Organizations
- IEEE
- PES
- ICC
- CIGRE

Registration
- Professional Engineer – Kansas, 2004
- Professional Engineer – Connecticut, 2006
- Professional Engineer – Massachusetts, 2010
- Professional Engineer – Washington, 2010

Years Experience
11 years

Years With Other Firms
0 years

Start Date
2000

Mr. Busby is an electrical engineer specializing in the design of underground transmission lines and electrical power substations.

Mr. Busby has been involved in the design of underground transmission projects ranging from 15-kV through 345-kV and substation projects ranging from 12-kV through 500-kV. His responsibilities include major equipment specification, cable ampacity calculations, physical design, grounding design, one-line diagram, equipment layout, relay and control schematics and wiring diagram, and coordination with contractors, material suppliers and clients.

Following is a summary of Mr. Busby's experience:

Middletown Power, GenConn Middletown, LLC.
Middletown, Connecticut, 2011
Provided technical support after failure of 345-kV XLPE cable termination.

Antelope Valley Solar Ranch, First Solar, Inc.
LA County, California, 2011
Project manager for 2.4 miles of 230-kV XLPE underground transmission. Created and administered procurement and construction contracts.

Lee County Electric Cooperative, Hypower, Inc.
Cape Coral, Florida, 2010
Performed cable ampacity study including duct bank design for new 138-kV XLPE transmission line. Created specifications and drawings for underground transmission line for a 138-kV transmission line.

Lower Snake River Wind Project, Puget Sound Energy
South Eastern Washington, 2010
Lead substation engineer for two 34.5-230-kV collector substations. This project consists of designing a four position and six position ring bus substations. Responsibilities included physical layout design, raceway design, rigid bus design, protection and controls design and control building layout.

Clark County Water Reclamation District, Colorado River Commission
Las Vegas, Nevada, 2009
Project manager for three 69-12.47-kV substations and 15-kV underground distribution feeders. Created and administered procurement and construction contracts.

Central Connecticut Reliability Project, Northeast Utilities
Western Connecticut, 2009
Performed studies for 345-kV underground transmission lines and associated cost estimates.

Middletown-Norwalk Project, Northeast Utilities
South Central Connecticut, 2008
Administered cable contracts for 345-kV XLPE cable including inspection and cable testing of final installation. Witnessed all commissioning tests for new transmission lines.

IPS-3 Project, Colorado River Commission
Las Vegas, Nevada, 2008
Performed cable ampacity study including duct bank design for new 69-kV XLPE transmission line. Created specifications and drawings for underground transmission line for a 69-kV transmission line.

Glenbrook Cables Project, Northeast Utilities
Southwest Connecticut, 2007
Administered cable contract for 115-kV XLPE cable including factory visits for cable testing. Engineering manager for the underground transmission line portion of the project.

Middletown-Norwalk Project, Northeast Utilities
South Central Connecticut, 2007
Administered cable contracts for 345-kV XLPE cable including factory visits for cable testing including Type Tests.

Central-South Transmission Line, Nashville Electric Service
Nashville, Tennessee, 2006
Created specifications and drawings for underground transmission line for a 69-kV transmission line.

69-kV Riverwalk Project, MidAmerican Energy
Des Moines, Iowa, 2005
Performed ampacity calculations, and created specifications for underground transmission line for the 69-kV Riverwalk Project.

Middletown-Norwalk, Northeast Utilities
South Central Connecticut, 2005
Aided in review of 345-kV underground transmission cable manufacturers and specifications.

Orlando Utilities Commission
Orlando, Florida, 2004
Created specifications for underground transmission line and witness factory testing of the 69-kV cable.

Borger Refinery, Conoco Phillips
Borger Texas, 2004
Performed ampacity calculations, estimates, routing and specifications for 115-kV underground transmission line within a refinery.

Card-Rhode Island, Northeast Utilities
Eastern Connecticut, 2004
Project Engineer for Connecticut to Rhode Island Project. Responsibilities include cost estimates and preliminary substation design.

Glenbrook Cables Project, Northeast Utilities
Southwest Connecticut, 2004
Project Engineer for Glenbrook Cables Project. This project consists of approximately 9 miles of 115-kV underground transmission in a heavily developed urban area. Responsibilities include routing studies, cost estimates and field work in preparation for

hearings.

Florida Power & Light Company
Broward County Florida, 2003
Performed ampacity calculations and estimate for 5.7 miles of 230-kV underground transmission line in a city setting.

Silver Creek 115-kV Substation Addition, South Mississippi Electric Power Association
Mississippi, 2002-2003
Project engineer for Silver Creek 115-kV substation addition. This project consists of designing a breaker and a half arrangement with six lines. Responsibilities included physical layout design, raceway design, rigid bus design, lightning protection, grounding design and control building layout.

Escondido Site Switchyard, Palomar Energy
San Diego California, 2002
Preliminary design for Escondido site switchyard including underground transmission lines from generator step-up transformers due to tight space constraints of the project site.

Project Name, Sempra Energy Resources
Tonopah Arizona, 2002
Performed core and coil inspection on a 500/230-kV 300/400/500 MVA auto transformer.

Confidential Client
2002
Performed ampacity calculations and estimate for underground, underwater, 230-kV transmission line shipping channel crossing for a confidential project/client.

Salt Valley Generating Station 115-kV Switchyard, Lincoln Electric System
Lincoln Nebraska, 2002
Project engineer for Salt Valley Generating Station 115-kV switchyard. Project consists of 115-kV collector bus. Responsibilities included physical layout design, rigid bus design, raceway design, grounding design, relay panel design and relaying.

Mobile Substation, Brazos Electric Power Cooperative, Inc.
2001
Performed core and coil inspection and witness testing on 138/26/13-kV 50 MVA transformer for a mobile substation.

Silver Creek GT 115-kV Substation, South Mississippi Electric Power Association
Central Mississippi, 2001
Project engineer for Silver Creek GT 115-kV substation. This project consists of designing a breaker and a half arrangement with three generators and two lines. Responsibilities included physical layout design, raceway design, rigid bus design, lightning protection, grounding design and control building layout design.

Mirant
2001

Performed core and coil inspection on two 18/345-kV GSU transformers.

Mesquite Generating Station 500/230-kV Switchyard, Sempra Energy Resources

Tonopah Arizona, 2001

Project engineer for Mesquite Generating Station 500/230-kV Switchyard. Project consists of a seven breaker single bus arrangement with three 300/400/500 MVA 500/230-kV autotransformers. Responsibilities included physical layout design, lighting design, rigid bus design, AC & DC schematics, relay panel design and relaying. Aided in the selection of major equipment.

Brazos Electric Power Cooperative, Inc.

Central Texas, 2000

Project engineer for several 69-kV and 138-kV Substations. Projects consist of upgrading distribution substations from 69-kV to 138-kV and adding new 138-kV transmission switchyards. Responsibilities included physical layout design, raceway design, grounding design, AC & DC schematics, control building layout design and relay panel wiring.

TAB 5
Robert E. Carberry

March, 2012

Robert E. Carberry
Manager – Project Manager, NEEWS Siting and Permitting
Northeast Utilities Service Company
Hartford, Connecticut

Education:

Bachelor of Science in Electric Power Engineering, June, 1972, Rensselaer Polytechnic Institute, Troy, NY

Master of Engineering in Electric Power Engineering, June 1973, Rensselaer Polytechnic Institute, NY

Management Development Program, Hartford Graduate Center, 1989

Experience:

June 1973 to March 1974 - Bechtel Associates Professional Corp., electrical design of Midland nuclear plant including load flow and voltage studies.

March 1974 to March 1975 - NUSCO, Protection Engineering Section. Performed relay settings and assisted Transmission Line Engineering.

March 1975 to March 1984 - NUSCO, Transmission Line Engineering. Standards, investigations and studies for permanent and temporary grounding, radio and audible noise, electrical/biological effects of AC fields, special insulation, thermal rating studies and research projects, high phase order, HVDC, compact line design, insulated shield wires, and lightning performance.

March 1984 to April 1985 - NUSCO, Substation Project Engineering. Project conceptual development and management plus associated studies and standards activities.

April 1985 to March 1988 - NUSCO, Substation Project Engineering Manager.

March 1988 to November 1992 - NUSCO, Manager of Substation Engineering and Design.

December 1992 to June 1997 - NUSCO, Manager of Transmission Line and Civil Engineering.

June 1997 to October 2000 - NUSCO, Manager of T&D Asset Strategy.

October 2000 to September 2001 - NUSCo, Manager of Transmission Engineering.

September 2001 to March 2003 - NUSCO, Project Manager – Bethel to Norwalk Transmission Project.

March 2003 to October 2004 - NUSCO, Project Director – Bethel to Norwalk Transmission Project.

October 2004 to January 2008 – NUSCO, Manager – Transmission Siting and Permitting.

February 2008 to Present – NUSCO, Project Manager, NEEWS Siting and Permitting

NU's EMF expert 1975- present and leader of the NU EMF Task Force established in 1990.

Other Experiences:

Adjunct Faculty Member, University of Hartford, College of Engineering, January to May, 1987. Conducted portions of course in Power Systems Analysis.

T&D Emergency plan assignment as First Deputy to the Director, Electric, a liaison position with the CT Office of Emergency Management, 1985 to 2002.

Member of Advisory Committee serving the Connecticut Interagency EMF Task Force, 1991 to present.

Professional Engineering Registration: Connecticut and Massachusetts

Industry and Professional Society Activities/Senior Member, IEEE (1983)

IEEE Power Engineering Society, Transmission and Distribution Committee memberships.

1) Corona and Field Effects (C&FE) Subcommittee, Member 1976 to 1987, Vice Chairman 1983 to 1985.

2) C&FE Working Groups on AC Fields and Audible Noise, 1976 to 1987.

3) Chairman of C&FE Working Group on Design and Environmental Considerations, 1977 to 1985.

4) Secretary and Vice Chairman of Administrative Subcommittee's Coordinating Group on Environment, Safety and Public Affairs, 1981 to 1984.

IEEE Power Engineering Society, Substations Committee memberships

1) Substations Committee, member 1987 to 1995

2) Environmental Subcommittee and Associated Working Groups, member 1985 to 1995.

3) Various Working Groups of the Distribution Substations Subcommittee and the Gas Insulated Substations Subcommittee, member 1985 to 1995.

Edison Electric Institute - Chairman of the Electric Light and Power group delegation to the American National Standards Committee C63 on Electromagnetic Compatibility, 1980 to 1985.

Electric Power Research Institute - Industry advisor on project RP1591, Assessment of AC Transmission Line Field Effects, 1982 to 1984. NU representative on Transmission Line Business Unit Council, October, 1995 to December, 1996, and on EMF/RF Area Council, 2005-present.

International Electrotechnical Commission, CISPR C - Member of an advisory group assisting the Technical Advisor to the U.S. National Committee of the IEC on matters pertaining to interferences from overhead power lines, 1980 to 1988.

Edison Electric Institute - EMF Task Force, 1990 to present: EMF Steering Committee 1995 to 2003.

Professional Recognitions:

IEEE PES Working Group Recognition and/or Prize Paper Awards

- AC Fields Working Group (1992)
- Working Group on Design and Location of Substations for Community Acceptance (1992)
- "A Survey of Methods for Calculating Transmission Line Conductor Surface Voltage Gradients," 1980
- "Corona and Field Effects of AC Overhead Transmission Lines: Information for Decision Makers," 1986

TAB 6
John C. Case

JOHN C. CASE

42 Warren Glen
Burlington, CT 06013

H: (860) 673-2447
W: (860) 665-2026

PROFESSIONAL EXPERIENCE

Project Manager – NEEWS Engineering 2007 - Present
Northeast Utilities Service Company - Hartford, CT

Responsibility for oversight and management of all aspects of engineering and project controls on the New England East-West family of projects. The New England East-West Solution is a group of 345-kV and 115-kV reliability upgrade projects throughout Southern New England, totaling an estimated $1.3 billion. This position involves the coordination of the System Planning and Engineering functions to establish the most cost-effective solutions for the project needs; establishing the scopes and estimates for all projects; review of all siting and engineering design documents; management and coordination of the engineering effort with internal and external engineering resources; transmission business and engineering responsibilities in the procurement effort; and engineering construction support including change management and outage planning.

Project Manager – Transmission Projects 2006 - 2007
Northeast Utilities Service Company - Hartford, CT

Overall management responsibility over all aspects of assigned transmission projects, including engineering, risk analysis and mitigation, siting and permitting, budget, contracting and closeout. Projects ranged in magnitude from $500,000 substation upgrades to $5,000,000 transmission line projects.

Construction Manager – Transmission Construction Test and Maintenance 2003 - 2006
Connecticut Light and Power Company - Hartford, CT

Responsibility for Owner's oversight and management of the construction effort on portions of the Bethel – Norwalk project including contractor coordination, site safety, compliance to specifications and contracts, outage clearance tag holder and change order negotiation. This was a $350,000,000 project to construct a 20+ mile transmission line in Southwest Connecticut. This project involved 345-kV and 115-kV XLPE underground cable, 345-kV HPFF cable, 3 intermediate 345-kV transition stations and two significant 345-kV GIS substation expansions. Segments under my direct responsibility included the following:

- Norwalk S/S – Civil site work and 115-kV transmission line relocations
- Norwalk S/S – upgrade replacements to 115-kV substation yard
- Plumtree S/S – Civil and Electrical construction of a 345-kV GIS substation and 345-kV XLPE line terminals.
- Hoyts Hill, Archers Lane and Norwalk Jct transition stations - Civil and Electrical construction of 345-kV XLPE and HPFF transition stations.
- Plumtree – Norwalk 345-kV line – All aspects of 345-kV and 115-kV overhead transmission line construction.

JOHN C. CASE

Project Engineer 1990 - 2003
Northeast Utilities Service Company - Hartford, CT

Project Engineer on a variety of construction projects involving all tasks associated with engineering, design, estimating, securing regulatory approvals, and drafting construction specifications.

Major projects include:
- Bethel – Norwalk 345-kV line – Lead Project Engineer responsible for all aspects of engineering through project siting approval.
  - Edison Electrical Institute Award
- NEON / NU Fiber optic backbone system – Lead Project Engineer in CT and MA for 245 miles of fiber optic cable installation, up to 122 fibers
  - Chairman's Award Nominee
- North Bloomfield – Agawam - Reconductor 18 miles of 115-kV double-circuit transmission line on an emergency basis
  - President's Award Winner
- Devon Station Generation - Connect emergency gas turbine generators to system
  - World Construction Record
- Developed pole-top extension to cost-effectively uprate 345-kV structures
  - Spot Recognition Award

Committees and Responsibilities held:
- Qualified Clearance Holder
- Transmission Standards Committees - Structures and Ratings Committees
- Dynamic Thermal Ratings Committee
- Develop structural alternatives to reduce magnetic fields
- Computer analyses (ETADS) of towers and design modifications

EDUCATION

Master of Business Administration May, 1998
University of Connecticut - West Hartford, CT

Bachelor of Science degree in Civil/Environmental Engineering May, 1990
Clarkson University - Potsdam, NY

HONORS AND ACTIVITIES

- Certified Engineer-in-Training in Connecticut
- Northeast Utilities Retail Business Group President's Award, 1998
- NU SPOT Recognition Awards 1993 and 1998
- Delta Sigma Phi National Fraternity

TAB 7
Kenneth Collison

KENNETH COLLISON **ICF INTERNATIONAL**
Vice President

EDUCATION

2002 MBA, Management and Consulting, Massachusetts Institute of Technology, Cambridge, MA
2001 M.S., Technology and Policy, Massachusetts Institute of Technology, Cambridge, MA
1989 B.S., Electrical and Electronic Engineering, University of Science and Technology – Ghana

EXPERIENCE OVERVIEW

Mr. Kenneth Collison joined ICF Consulting in July 2002 and currently leads ICF's Transmission and Ancillary Services Group within the Wholesale Power Practice. Mr. Collison's expertise is in transmission studies, power system reliability studies, critical infrastructure protection, transmission and ancillary services valuation, generation analysis, utility restructuring, and strategic studies. Mr. Collison has developed full AC non-linear power flow models for detailed power system engineering studies including power system reliability assessment, contingency analysis and total transfer capability analysis for the networks of several power pools in the US. In several power markets, Mr. Collison has led studies to determine the impact of major proposed transmission projects on the ability of the market operators to reliably meet system demand. These include studies to assess reliability and economic benefits of new transmission lines such as the project proposed by Kelson Transmission to connect non-ERCOT areas in east Texas to the Houston zone of ERCOT; the New England East-West Solutions (NEEWS) project proposed by Northeast Utilities and National Grid to improve reliability in southern New England; the Mid-Atlantic Power Pathway (MAPP) project proposed by Pepco to improve reliability and transfer capability in the Mid-Atlantic area of the PJM RTO; and the Plains and Eastern Clean Line proposed by Clean Line Energy Partners to enable transfer of large amounts of renewable generation from the Midwest to the Southeastern U.S. Mr. Collison has testified in several states in support of transmission projects. In an internal ICF study, Mr. Collison led a team that assessed the impact of large scale coal plant retirements on the reliability of the bulk power system. The study examined the impact of generation retirements on nodal voltages and transmission system performance under normal and contingency conditions. Mr. Collison was also the transmission lead during ICF's study of the costs and benefits of the GridFlorida RTO, a study that examined in detail the cost of implementing an independent system operator for the Florida market and the benefits in reduced cost to consumers over a 12-year timeframe. Similarly, he provided transmission expertise during ICF's analysis of the benefits of the Midwest ISO's Day-2 market, which determined the benefits of the transition of the Midwest ISO to a fully competitive market with centralized commitment and dispatch. In addition, Mr. Collison has managed several security constrained optimal power flow studies using linear optimization-based power flow simulation models to determine the economic dispatch of units within system stability and transmission limits. He has prepared congestion forecasts and determined the related congestion revenue and costs for the interconnected transmission networks in the US. Mr. Collison also specializes in risk-based and readiness reliability assessment for the bulk power system within the framework of the mandatory NERC reliability standards. Prior to joining ICF Consulting, Mr. Collison worked as a Research Associate at the Massachusetts Institute of Technology (MIT) Laboratory for Energy and the Environment, studying innovative methods to manage congestion and optimize inter-regional transactions in the US electricity markets. He also worked as an Electrical Engineer with Kaiser Aluminum. Mr. Collison holds a Master of Business Administration degree and a Master of Science degree in Technology and Policy from MIT, and a Bachelor of Science degree in Power Systems Engineering from the University of Science and Technology – Ghana.

RELEVANT EXPERIENCE

Wholesale Power Market Analysis: Mr. Collison has performed studies for several clients in the power generation sector that required a detailed analysis of the power markets. For these clients Mr. Collison assessed generation facility dispatch, forecast energy price and estimated gross revenues. In many cases Mr. Collison has used the GE Energy MAPS model to develop a least cost economic model of the US power market, while enforcing transmission and stability limits to forecast hourly dispatch and locational prices and to assess the impact of transmission constraints on the facilities.

Critical Infrastructure Protection: Mr. Collison has led risk-based assessment studies to determine generation and transmission facilities that are critical to the operation of the bulk power system within the framework of the North American Electric Reliability Corporation (NERC) reliability standards. These studies include assessments of the operation of the facility and the impact of the loss of the facility on grid operations under various system conditions.

Economic and Reliability Benefits of Transmission Lines: Mr. Collison has led studies to assess the economic benefits of proposed transmission projects in several power markets.

- Mid-Atlantic Power Pathway (MAPP): Mr. Collison conducted a study for Pepco Holdings, Inc. to determine the economic benefits of the Mid-Atlantic Power Pathway (MAPP) Project and supported the application of Potomac Electric Power Company and Delmarva Power & Light Company for a Certificate of Public Convenience and Necessity before the Public Service Commission of Maryland.
- Kelson Transmission: In Texas, Mr. Collison assessed the benefits of a large transmission project that would interconnect the Houston load zone with generation in a non-ERCOT section of Texas. The project would enable the importation of significant amounts of power into the Houston load pocket. Mr. Collison supported Kelson's filing before the Public Utility Commission of Texas for a Certificate of Convenience and Necessity.
- New England East West Solutions (NEEWS): Mr. Collison is also leading a study for Northeast Utilities and National Grid to demonstrate the need for the New England East West Solutions (NEEWS) transmission projects. These projects have been proposed to address some of the major transmission constraints and reliability concerns in New England. The analysis includes an assessment of the reliability benefits of the projects relative to non-transmission alternatives, to determine if the non-transmission resources can displace or defer the projects. Mr. Collison is providing testimony to support the filing for certificates of need.
- Plains and Eastern Clean Line: In the Midwest, Mr. Collison led detailed power flow and economic studies to determine the benefits of the Plains and Eastern Clean Line. The Plains and Eastern Clean Line is a major high voltage direct current project proposed to originate in western Oklahoma and terminate in Tennessee, and enable the transfer of large amounts of renewable generation from western Oklahoma to the southeastern U.S.

Transmission Planning and Analysis: Mr. Collison's transmission analysis effort includes interconnection feasibility studies, power deliverability assessments, congestion forecasts, FTR price forecasts, reliability studies, and transfer capability assessments.

- Regional Transmission Planning: Mr. Collison is the manager and senior transmission expert for the ICF team selected by WECC to provide technical support to the Scenario Planning Steering Group (SPSG), a multi-stakeholder group formed by WECC to help guide the Regional Transmission Expansion Planning (RTEP) process.
- Reliability Studies: Mr. Collison has analyzed many power networks to assess the impact of planned upgrades or additions on system reliability. Many of these studies have demonstrated the benefits and supported the implementation of new transmission projects. For example, Mr. Collison led a team to prepare seasonal snapshot model of the northeast US power market to support a client's major transmission project. The models were prepared to reflect normal and emergency operation of the transmission network in the future. Generation facility additions and retirements, demand growth, and demand response were incorporated and transmission thermal and stability limits were strictly enforced. The analysis showed that the new project alleviated thermal and voltage violations and improved the ability of the system to serve the increased demand reliably. He also led an internal ICF study to assess the impact of large scale coal plant retirements on the reliability of the bulk power system. The team performed detailed power flow

modeling and contingency analysis of the Eastern Interconnection, with focus on markets where large amounts of coal capacity could retire as a result of environmental regulations. The team then analyzed nodal voltages and transmission system performance to determine if the bulk power system would continue to operate reliably, without any voltage or thermal reliability criteria violations following the retirement of the generation facilities.

- Interconnection Feasibility Studies: For planned generation facilities Mr. Collison has managed detailed power flow studies to determine the transmission facility additions and upgrades that would be necessary for interconnection and operation. Using the PSLF and PowerWorld power flow models, seasonal snapshots of the power system are examined with and without the planned facility to determine the incremental effect of dispatch from the facility on the transmission grid. The system is examined under both normal and emergency conditions to ensure that likely operating scenarios are properly accounted for. Transmission facility thermal and voltage limit violations due to the facility dispatch are noted, and the cost of upgrades to alleviate the violations is estimated. Clients have used the results to determine appropriate interconnection substations for their facilities.
- Power Deliverability Assessments: Mr. Collison has helped clients assess the ability of their units to deliver power to particular load centers subject to transmission facility operating limits. Mr. Collison develops models similar to those used in the interconnection feasibility studies and simulates different levels of power transfer from the source (generation facility) to the sink (load center). Transmission facility thermal and voltage limit violations due to the transactions are noted, and the cost of upgrades to alleviate the violations is estimated. Based on such analyses, clients are able to determine favorable markets and assess the feasibility of proposed power contracts.
- Congestion and FTR Price Forecasts: Mr. Collison has assessed congestion risk for clients by forecasting congestion in the power markets and, if required, forecasting FTR prices. Mr. Collison uses hourly nodal models of the power markets to simulate dispatch and power flows in the transmission network. These models have detailed representation of generation and transmission facilities in the market, and transmission facility thermal and stability limits are strictly enforced. A forecast is prepared of the congested facilities, the number of hours of congestion, and the price impact. The FTR price is estimated from the difference between congestion components of the energy prices.
- Transfer Capability Assessment: Mr. Collison leads the effort to estimate the power transfer capability between load zones, utilities, or power markets for ICF internal use and for clients. This is critical in properly capturing trade between markets.
- Transmission and Distribution Business Planning and Strategy: Mr. Collison has worked with a participant in the Midwest ISO market to analyze the current trends and options in transmission investments to support the client's effort to develop a strategy for transmission investments. Mr. Collison is also working with a utility in the northeast to analyze the impact of potential carbon regulations on the utility's transmission and distribution assets and develop a mid- to long-term transmission and distribution investment strategy.

Asset Valuation and Market Studies: Mr. Collison has led studies focusing on the valuation of generation assets in several markets. Using fundamentals analysis, these studies have included forecasts of energy and capacity prices and assessments of facility dispatch. Further, facility performance was assessed under alternative scenarios to assess the impact of key market drivers – fuel prices, demand, allowance prices, air regulatory policies, resources additions or retirements, and other parameters – on the facility revenue. Many of these studies have been used to support project financings.

Renewables Market Analysis: Mr. Collison has helped clients to assess sites for wind generation vis-à-vis the accessibility of transmission and the ability to deliver the power to load centers. He has also worked with clients to determine the ability of proposed cleaner generation facilities to displace dispatch from existing "dirtier" facilities and thus reduce overall emission of pollutants. Mr. Collison's analysis of renewables includes studies in markets such as the Midwest ISO and the Southwest Power Pool to assess the transmission curtailment risk for proposed and existing wind generation resources. This was based on analyses of the transmission grid, market data, and detailed internal engineering and economic modeling.

Cost Benefit Studies: Mr. Collison has led and performed studies to estimate the costs and benefits of proposed projects and programs to help clients understand the value of these projects and programs relative to the cost. Mr. Collison's recent analysis has included cost-benefit studies for market restructuring programs and proposed transmission line projects.

- *Analysis of the Benefits of the Midwest ISO's Day-2 Market:* Mr. Collison was the transmission lead in the study to determine the benefits of the transition of the Midwest ISO to a fully competitive market with centralized commitment and dispatch. This analysis involved detailed modeling of the US Eastern Interconnect with a focus on the Midwest ISO footprint under security constrained unit commitment and economic dispatch conditions. ICF coordinated with dozens of stakeholders to collect data reflecting the operation of the Midwest ISO system. Using the data, ICF calibrated its model to a recent operating year and estimated the benefits of the market transition by comparing an actual Midwest ISO Day-2 operation to a simulated Midwest ISO Day-1 operation. Additionally, ICF estimated the maximum benefits achievable from an optimal Day-2 operation to reflect the potential to increase savings to the Midwest ISO consumers from incremental operational improvements to current Day-2 operations.
- *GridFlorida RTO Cost Benefit Analysis:* Mr. Collison provided transmission expertise to utilities in the Florida power market in determining the costs and benefits of restructuring the multi-utility control area operation to a centrally coordinated and dispatched market. Mr. Collison's contribution included model calibration to a base year, then modeling least cost economic dispatch subject to transmission line and system stability limits going forward under both current and RTO operation. Based on the results of the study the incumbent utilities and the Florida Reliability Coordinating Council (FRCC) will assess the viability of a transition to an RTO structure.

Regulatory Proceedings: Mr. Collison has assisted in the preparation of testimony for state proceedings. These include siting of power generation and transmission facilities; utility cost of service proceedings; market structure; and air quality improvements. Mr. Collison has also filed testimony and testified in support of several clients. See detailed description of testimony in the section on testimonies below.

SELECTED PUBLICATIONS AND PRESENTATIONS

Panel Chair, Retirements, Retrofits, New Builds, and System Reliability session. EUCI conference on Future of The U.S. Generation Fleet, Arlington, VA, December, 2011.

Kumaraswamy K., K. Collison. "Challenges of Costing Transmission in a World of Economic Volatility", The Electricity Journal, Volume 24, Issue 10, December 2011, Pages 41-50, ISSN 1040-6190, 10.1016/j.tej.2011.10.017. (http://www.sciencedirect.com/science/article/pii/S1040619011002843)

Henke R., E. Roseman, J. Rose, K. Collison. "Complying with FERC Order 1000." ICF Energy and Environment Intelligence Webinar Series, September 2011.

Rose J., K. Collison, H. Parmar. "Retiring Coal Plants While Protecting System Reliability." ICF White Paper, July 2011.

Rose J., K. Collison, "Impact of Large Scale Coal Retirements on Transmission System Reliability." ICF Energy and Environment Intelligence Webinar Series, May 2011.

Collison, K. "Impact of Large Scale Coal Retirements on Transmission System Reliability." EEI Strategic Issues Roundtable Presentation, New Orleans, LA, March 2011.

Rose, J., K. Collison. "Fundamentals of Electricity Transmission." EUCI Course Presentation, San Diego, CA, March 2011.

Collison, K., V. Banunarayanan. "Fundamentals of Electricity Transmission." EUCI Course Presentation, Calgary, Alberta, November 2010.

Rose, J., K. Collison. "Fundamentals of Electricity Transmission." EUCI Course Presentation, Arlington, VA, June 2010.

Henke R., K. Collison, V. Banunarayanan, K. Kumaraswamy, C. Jacobson. "Wyoming Collector and Transmission System Conceptual Design." February 2010.

Rose, J., K. Collison. "Fundamentals of Electricity Transmission." EUCI Course Presentation, Orlando, FL, January 2010.

Henke R., J. Rose, K. Collison, V. Banunarayanan, K. Kumaraswamy, C. Jacobson, N. Pande. "Framework for Analyzing Separation Distances between Transmission Lines in Wyoming." August 2009.

Collison K. "Introduction to Engineering." Presented at the EEI Transmission Wholesale Markets School, Washington D.C., June 2009.

Collison K. "Transmission Engineering Issues." Presented at the EEI Transmission Wholesale Markets School, Washington D.C., June 2009.

Austria R., K. Collison, V. Banunarayanan, P. Gilmartin, R. Tapia. "Technical Assessment of the Impact of the NYRI Line on System Reliability and Congestion." January 2009.

Rose J., K. Collison, K. Kumaraswamy. "Addendum to the Independent Assessment of Midwest ISO Operational Benefits". May 2007.

Rose J., C. McCarthy, K. Collison, H. Parmar. "Independent Assessment of Midwest ISO Operational Benefits". February 2007.

Ofori-Atta K., J. Rose, C. McCarthy, H. Parmar, K. Collison, E. Roseman, S. Muthiah, M. Scheller. "Cost-Benefit Study of the Proposed GridFlorida RTO." December 2005.

Ofori-Atta K., K. Collison. "Modeling and Forecasting Operating Reserve Prices in LMP Markets." Presented at EUCI Ancillary Services Conference, October 2003.

Collison K. "A Practical Approach to Optimal Pricing and Implementation of Inter-regional Transactions in Electricity Markets Under Restructuring." June 2001.

Yoon, YT, M.D. Ilic and K.K.Collison. "Efficient Implementation of Inter-regional Transactions." January 2001, pp 36.

Yoon, YT, J.R. Arce, K.K.Collison and MD Ilic. "Implementation of Cluster-based Congestion Management Systems." May 2000, pp 21. Presented at ICPSOP 2000 – Restructuring The Power Industry For The Year 2000 And Beyond in July 2000.

Yoon, YT, K.K.Collison, J.R. Arce and MD Ilic, Congestion Management System Methods: Comparison on the 118 Bus System, July 2000, pp 21. Presented at 32nd Annual North America Power Symposium (NAPS 2000), Waterloo, Ontario, Canada in October 2000.

Yoon, YT, MD Ilic, K.K.Collison, and J.R. Arce, Practical Implementation of Congestion Cluster Pricing Method, August 2000, pp 30.

TESTIMONY

- Rebuttal Testimony of Kenneth K. Collison on Behalf of Potomac Electric Power Company, Review of Potomac Electric Power Company's Estimates of Electric Power Consumption by Perini/Tompkins Joint Venture's Temporary Electric Service at the National Harbor for 29-Month Period during Which No Metered Consumption Data Is Available, Before the Public Service Commission of Maryland, In the Matter of Potomac Electric Power Company v. Perini/Tompkins Joint Venture, Case No. 9210, August 22, 2011.

- Direct Testimony of Kenneth K. Collison on Behalf of Potomac Electric Power Company, Review of Potomac Electric Power Company's Estimates of Electric Power Consumption by Perini/Tompkins Joint Venture's Temporary Electric Service at the National Harbor for 29-Month Period during Which No Metered Consumption Data Is Available, Before the Public Service Commission of Maryland, In the Matter of Potomac Electric Power Company v. Perini/Tompkins Joint Venture, Case No. 9210, July 11, 2011.
- Direct Testimony of Kenneth K. Collison on Behalf of Potomac Electric Power Company and Delmarva Power & Light Company, Before the Public Service Commission of Maryland, In the Matter of the Applications (1) To Establish the Overall Need for Construction of a New Transmission Line Known as The Mid-Atlantic Power Pathway (MAPP) Project; (2) To Modify the Certificate Of Public Convenience And Necessity in Case No. 6526 to Construct an Already Approved Second 500 kV Circuit an New Supporting Structures Across the Potomac River; And (3) To Modify the Certificate of Public Convenience in Case No. 6984 to Replace Certain Existing Structures for the Existing 500 kV Circuit In Calvert County. Maryland PSC Case No.9179, November 5, 2010.
- Review of Potomac Electric Power Company's Estimates of Electric Power Consumption by Perini/Tompkins Joint Venture's Temporary Electric Service at the National Harbor for 29-Month Period during Which No Metered Consumption Data Is Available, Prepared for Potomac Electric Power Company, Before the Public Service Commission of Maryland, In the Matter of Potomac Electric Power Company v. Perini/Tompkins Joint Venture, Case No. 9210, November 1, 2010.
- Oral Direct Testimony on Behalf of Western Massachusetts Electric Company concerning Non-Transmission Alternatives (related to the Greater Springfield Reliability Project), before the Commonwealth of Massachusetts Energy Facilities Siting Board, Docket No. EFSB 08-2/DPU 08-105/DPU 08-106, November 17, 2009.
- Panel Testimony on Behalf of Connecticut Light and Power concerning Non-Transmission Alternatives (related to the Greater Springfield Reliability Project), Before the State of Connecticut Siting Council, Docket No. 370, July 22, 2009.
- Direct Testimony of Kenneth K. Collison on Behalf of Potomac Electric Power Company and Delmarva Power & Light Company, Before the Public Service Commission of Maryland, In the Matter of the Application of Potomac Electric Power Company and Delmarva Power and Light Company for a Determination of Need Under a Certificate of Public Convenience and Necessity for the Mid-Atlantic Pathway Project in Maryland and the Construction of an Extra High Voltage Transmission Line from Calvert County, Maryland to the Western Shore of the Chesapeake Bay, and the Construction of an Extra High Voltage Transmission Line from the Maryland Eastern Shore of the Chesapeake Bay to a New Substation in Vienna, Maryland, and to the Maryland State Line Bordering Delaware and Jointly Filed in Case Nos. 6526 and 6984, February 25, 2009.
- Testimony of Kenneth K. Collison for the Narragansett Electric Company d/b/a National Grid (Rhode Island Reliability Project), Before the State of Rhode Island Public Utilities Commission, Notice of Designation to Render an Advisory Opinion to the Energy Facility Siting Board Regarding the Need and Cost-justification for the Narragansett Electric d/b/a National Grid's proposal to construct and alter major energy facilities, the "Rhode Island Reliability Project", RIPUC Docket No. 4029, February 20, 2009.
- Prepared Testimony of Kenneth K. Collison on Behalf of Communities Against Regional Interconnect (CARI), Before the State of New York Public Service Commission, In the Matter of New York Regional Interconnect, Case No. 06-T-0650, January 9, 2009.
- Supplemental Direct Testimony of Kenneth K. Collison for Kelson Transmission Company, LLC, Before the State Office of Administrative Hearings, Application of Kelson Transmission Company, LLC for a Certificate of Convenience and Necessity for the Amended Proposed Canal to Deweyville 345 kV Transmission Line Within Chambers, Hardin, Jasper, Jefferson, Liberty, Newton and Orange Counties, SOAH Docket No. 473-08-3341, PUC Docket No. 34611, (Public Utilities Commission of Texas), June 18, 2008.

EMPLOYMENT HISTORY

ICF Consulting	Vice President	2009
ICF Consulting	Principal	2008
ICF Consulting	Senior Manager	2007
ICF Consulting	Project Manager	2005-2006
ICF Consulting	Senior Associate	2002-2004
MIT CEEPR	Research Assistant	2001-2002
MIT Energy Laboratory	Research Assistant	1999-2001
Kaiser Aluminum	Electrical Engineer	1990-1999

TAB 8
Christopher Fritz

Christopher Fritz

Expertise

- Utilities' Forest Management
- Applied Silviculture in Southern New England Forests
- Forest Products Harvest Layout and Design
- Environmental Compliance

Education

- B.S. - Dual Major in Forest Biology and Wildlife Management, SUNY College of Environmental Science and Forestry, 1990

Organizations

- Society of American Foresters (SAF)

Registrations

- SAF Certified Forester
- Licensed Forester in CT. and MA.
- Certified Tree Farm Inspector in CT. and MA.

Total Years of Experience

20+

Years With Burns & McDonnell

4

Start Date

2007

Mr. Fritz has extensive experience in forest management, tree species identification, forest inventory and sampling design, species growth requirements and habits, individual tree measurement techniques, local permitting, environmental compliance, and forest products harvests and markets. As a forester, Mr. Fritz has acquired a working knowledge of construction and logging equipment and best management practices (BMPs), and has been responsible for designing environmentally compatible forest access road systems for many large and small forest products harvesting operations. He has also been actively involved in supervising and monitoring the construction, maintenance, rehabilitation and close out of these forest access road systems.

He also has gained experience in communicating with a wide variety of stakeholders, including clients, regulatory agencies, the general public and construction and logging subcontractors. The following is a summary of Mr. Fritz's experience at Burns & McDonnell.

New England East-West Solution (NEEWS), Northeast Utilities System Connecticut and Massachusetts

2007-Present

New England East-West Solution (NEEWS) encompasses four related transmission projects developed to solve five transmission problems identified during a regional planning process. The main components of these projects are 345-kilovolt (kV) lines, but they also include upgrades to substations and improvements to the region's 115-kV electric system. Burns & McDonnell is providing the design, construction, permitting, and complete environmental oversight of the development of three of the new transmission lines in Connecticut and Massachusetts. Mr. Fritz is involved in this project as a member of the environmental team during the planning and permitting phases, which are currently ongoing. His primary responsibilities are coordinating with and managing the activities of several subcontractors in the field that are collecting data regarding wetlands, access road locations, structure work site locations, threatened and endangered species, vegetation types and potential impacts to them, and above ground cultural resources. Communicates with other NU and Burns & McDonnell managers and staff regarding engineering, real estate, siting and permitting and community relations efforts, particularly as they relate to real estate and environmental field efforts. Provides input on developing and reviewing siting and permitting mapping and environmental documents.

The Middletown | Norwalk Project
Northeast Utilities System

Connecticut, 2006 – 2007

As a contractor to Burns & McDonnell, Mr. Fritz supervised land clearing activities for the overhead portion of the project. His primary responsibilities were to ensure these activities were conducted in compliance with all environmental and siting requirements established for the project. He also was responsible for environmental inspections associated with construction activities.

Senior Forester
Ferrucci & Walicki Forest Management
Middlefield, Connecticut

1991-2007

As a leading consulting company in southern New England Ferrucci & Walicki provides high level forest management planning and technical services to a wide

variety of clients, including utility companies, municipal water departments and private water companies. Mr. Fritz's primary duties included managing all aspects of the company's planning and on the ground services for their clients. He managed a staff of assistant foresters and was actively involved in all aspects of the long-term planning studies and data collection and permitting efforts, as well as designing and implementing specific silvicultural recommendations necessary to maintain, protect and/or enhance the overall health of the client's forest resources.

TAB 9
R. Michael Hatfield

R. Michael Hatfield

Expertise

- Transmission Line Design
- Plan/Profile Spotting
- Insulator/Hardware Design
- Transmission Line Detailing
- Computer-Aided Drafting

Education

- Longview Community College

Years Experience

30

Years With Other Firms

0

Start Date

June 1977

Mr. Hatfield is a design/detailer specializing in the design of transmission lines and substation physical layout.

Mr. Hatfield is the CADD Department Manager in the Transmission and Distribution Division. He is proficient in computer-aided drafting using AutoCAD or Microstation. Mr. Hatfield is an experienced transmission line designer.

Mr. Hatfield has performed various phases of transmission line design including insulator and hardware design, sag tension, steel, concrete and wood pole design and specifications.

Mr. Hatfield has provided transmission line design for the following major transmission line and substation projects: 230-, 161- and 92-kV transmission lines for Imperial Irrigation District, California; 345-kV transmission lines, Austin, Texas; 345-kV and 138-kV transmission lines for Deseret G&T Cooperative, Utah; Wilmar (Minnesota) Municipal Utilities Commission 69-kV transmission line; 345-kV and 230-kV transmission lines for Arizona Electric Power Cooperative; 230-kV and 115-kV transmission lines for Alabama Electric Power Cooperative; 345-kV and 230-kV transmission lines for Missouri Basin Power Project; 345-kV transmission line for Sunflower Electric Cooperative; 230-kV transmission line for Seminole Electric Power Cooperative; 138-kV transmission line for Western Farmers Electric Power Cooperative; 161-kV and 345-kV transmission lines for Associated Electric Cooperative; 500-kV transmission line for M&A Electric Power Cooperative; and 230-kV transmission lines for Blue Ridge EMC.

Multiple 138-kV Transmission Lines, TXU ED

Texas, 2002-Present

Project designer for 138-kV transmission line projects. Responsibilities include budgets, estimates, material requests, transmission design and construction coordination.

Multiple 138-kV Transmission Line Studies, TXU ED

Texas, 2002

Project designer for 138-kV transmission line studies. Responsibilities include assisting in the analysis for existing 138-kV lines for rebuild, upgrades or reconductoring.

City of Bentonville

Arkansas, 2000-Present

Project designer for several 161-kV single circuit transmission lines. Lines consisted of wood tangents, steel pole deadends with at 161-kV switches.

Tenaska

2001

Design/build lead designer for 345-kV transmission line. Responsible for structure design and hardware coordination with client.

Rochester Public Utilities

Illinois, 2001

Project designer for 161-kV transmission line upgrade. Responsible for analyzing existing structures and recommending new options with minimal outages.

City of Lenexa/Kansas City Power & Light
1999-2000
Project designer for 345-kV transmission line relocation project. Line consisted of coordination with adjacent property owners and golf course using KCP&L steel pole and line hardware standards.

Archer Daniels Midland
1998-1999
Project designer for 69kV double circuit transmission line with 12kV distribution underbuild. Line consisted of steel and wood pole design.

Rochelle Municipal Utilities
1996-1999
Project design/detailer for 138-kV system expansion.

Ohio Edison
1997
Project designer for 1300 ft. of underground 138-kV cable with OPGW. Project consisted of two 3 pole guyed steel pole riser structures and OPGW deadend and splice box details.

Lincoln County Power District No. 1
1997
Project designer for 138kV wood H-frame transmission line. Duties consisted of project design and project management.

Colorado River Commission
1997
Project designer for 69-kV transmission line. Consisted of steel and wood pole design.

Archer Daniel Midland
1995
Upgrade of existing 34.5-kV line. Responsibilities include steel and wood design, insulator/hardware design and specifications.

Public Service of Indiana
1992-1996
Project design detailer for various substation projects. Responsibilities include physical layout, specifications and materials.

Irby Construction Co.
1991-1992
Project designer/detailer for 92- and 161-kV transmission lines. Responsibilities included the layout and routing of the lines on the plant site.

U.S. Army Corps of Engineers
Lake City, 1990
Project designer for 12.5-kV distribution line upgrade. Responsible for structure layout and material, including coordination with project engineers and detailers.

Florida Power Corporation
Florida, 1988-1989
Project designer/detailer for two 69-kV transmission lines, 12 miles and 13 miles in length. Responsibilities were material contract and structure spotting, as well as project detailing.

Irby Construction Co.
1987-1988
Project designer/detailer for 11 miles of 161-kV, 85 miles of 230-kV and 11 miles of 92-kV for Imperial Irrigation District. Responsibilities were structure spotting, drawings, plan and profile detailing.

Blue Ridge EMC
1986-1987
Project designer/detailer for 20 miles of 230-kV transmission line. Responsibilities were assisting project engineer in structure design and structure spotting. Conceptual drawings and plan and profile preparation.

Deseret G&T Cooperative
1981-1986
Project designer/detailer for 172 miles of 345-kV lattice steel and 51 miles of 138-kV wood H-frame. Responsibilities were conductor sag tension, material take-off quantities and structure spotting, as well as conceptual drawings and plan and profile preparation.

Sunflower Electric Cooperative
1981-1982
Project designer/detailer for 150 miles of 345-kV lattice steel transmission line. Responsibilities were structure spotting and plan and profile preparation.

Seminole Electric Cooperative
1980-1981
Project detailer for 55 miles of lattice and tubular steel 230-kV transmission line. Responsibilities included conceptual steel detailing, sag tension, and plan and profile preparation.

M&A Electric Cooperative
1979-1980
Project designer/detailer for 55 miles of lattice steel 500-kV transmission line. Responsibilities included coordinating with R.O.W agent, for clearing and final structure spotting. Material quantities and monthly construction pay estimates with involved coordination with the client and contractor. Project detailer on conceptual drawings and plan and profile preparation.

TAB 10
Anthony W. Johnson, III

ANTHONY W. JOHNSON, III
272 Lincoln Street
Kensington, Connecticut 06037
Home: (860) 225-1637 Business: (860) 665-3858

EDUCATION:

May, 1980

Bachelor of Science: Agronomy, College of Agriculture and Natural Resources
Bachelor of Arts: Geography, College of Liberal Arts and Science
University of Connecticut, Storrs, Connecticut

Post-graduate courses in Business Administration and Agronomy

EMPLOYMENT:

May, 2002 to Present

Manager, Transmission Vegetation Management, Northeast Utilities Service Company
Berlin, Connecticut

Management position responsible for the development and administration of vegetation management programs on the NU transmission system covering the three-state area of Connecticut, Massachusetts and New Hampshire. Overall responsibility for VM budgets, scheduling, contracting and performance evaluations for approximately 40,000 acres of transmission rights-of-way. Also involved with the environmental aspects and stewardship of vegetation control practices and wildlife habitat and use of rights-of-way. Currently supervising four Transmission Arborists.

February, 1993 to April, 2002

Senior Scientist, System Forestry - Northeast Utilities Service Company
Berlin, Connecticut

Staff position responsible for assisting in the development and administration of vegetation control programs for the Northeast Utilities electric production facilities, transmission and distribution systems. Major responsibilities include the development of specifications and contract documents for system programs covering distribution line clearance activities, rights-of-way vegetation control, weed control programs as well as landscaping, grounds maintenance and snow removal activities for over 400 system properties. Also included is the evaluation of herbicide materials and application systems for potential use on system projects. Other responsibilities include the development and use of software programs for tracking, monitoring and reporting of the various vegetation management and grounds maintenance activities along with the development and administration of training programs for company line clearance personnel in rights-of-way management, line clearance activities and system vegetation management programs. Some experience with the regulatory and legislative actions affecting vegetation management activities in all three service area states.

January, 1987 to February, 1993

Scientist, System Forestry - Northeast Utilities Service Company
Berlin, Connecticut

Similar duties as those listed above.

February, 1981 to December, 1986

Energy Consultant, Energy Management Services - Connecticut Light & Power Company
Stamford, Connecticut

Account representative position responsible for servicing large commercial and industrial gas and electric accounts, including interpretation of company policies, procedures and rate evaluations. Also responsible for the performance of commercial and industrial energy audits and the recommendation of energy conservation practices and equipment.

CERTIFICATIONS:

- Commercial Supervisory Pesticide Certification - Rights-of-Way (Connecticut & Massachusetts)
- Commercial Supervisory Pesticide Certification - Wood Preservatives (Connecticut)
- Commercial Supervisory Pesticide Certification - Research & Development (Connecticut)

PROFESSIONAL AFFILIATIONS:

- Professional Soil Scientist - The Soil Scientist Society of Southern New England
- Immediate Past President – Connecticut Environmental Council
- Member – Seacoast Land Trust – Portsmouth, New Hampshire
- Member – Connecticut Tree Protection Association
- Member – Mountain Lake Vegetation Management Council
- Member – Connecticut Invasive Plants Working Committee

TAB 11
Timothy F. Laskowski

Timothy F. Laskowski

CAREER SUMMARY

- Managed all the power flow, stability and short circuit studies for the New England East West Solution. Worked with ISO-NE, NSTAR and National Grid in ensuring that an integrated solution to solve problems was obtained and approved. Worked closely with other disciplines within Northeast Utilities in defining a feasible engineering solution.
- Performed and managed transmission planning studies for Connecticut and Western Massachusetts.
- Managed transmission planning studies for the Northern Pass Project and Notheast Utilities contributions to the Greater Boston Working Group studies.
- Managed the development of PTI transmission products PSS/E, MUST and TPLAN. While managing PSS/E it became the most widely used program of its type. The average PSS/E developer has been on the team for more than 12 years because of my dedication to a team philosophy and ability to work with them collaboratively. Provided customer training in the use of the PSS/E program and provided support in engineering use of the PSS/E program. This required strong interpersonal communications skills.
- Primary sales person for the PSS/E program. PSS/E sales were sufficient to cover all yearly costs; contributing to overall company profitability.
- Developer of several different portions of the PSS/E program. This required team interaction as the contributing developments often overlapped.
- Writer of the application guide describing engineering behind the PSS/E program. This was another major contribution to the success of the program and along with code development shows that I was a significant technical contributor.

TECHNICAL SUMMARY

- Proficient in all aspects of PTI's Power System Simulator for Engineering, PSS/E
- Experienced in use of PTI's Managing and Utilizing System Transmission, MUST
- Able to program in FORTRAN and PSS/E 's IPLAN languages
- Experienced in the Use of Microsoft Windows NT, XP, 2000 Operating Systems
- Experienced with Microsoft Office Tools

PROFESSIONAL EXPERIENCE

Northeast Utilities — Berlin, CT
Transmission Planning Product Manager — *2004-2012*

My initial responsibilities at this position was to coordinate the development of all transmission planning studies for the Eastern Connecticut, Middletown and Manchester-Barbour Hill areas of Connecticut. As a product manager, my responsibilities were expanded to include overseeing others and developing other projects in other regions of the company. My responsibility was also refocused as the lead engineer and manager of the New England East West Solution (NEEWS). This major set of projects expanded my role to also include Western Massachusetts studies then being performed. The tasks at this position were:

- Manage others in the development of various transmission reliability solutions
- Perform analysis using PTI transmission products PSS/E and MUST
- Developed all the alternatives for the Interstate and Central Connecticut Reliability Projects for NEEWS

- Work with substation engineering, transmission line design and protection to design solutions
- Interface with ISO-NE and other transmission owners to obtain ISO-NE approvals
- Provide input into the various regulatory processes for the projects

Transmission Planning Senior Engineer *2003-2004*

My responsibilities at this position were to perform studies and define alternatives that address various transmission reliability problems. Once a feasible engineering solution was obtained, my duties involved first obtaining the various ISO-NE approvals and to contribute to the various regulatory filings required. Because of my experience with Siemens PTI tools, I contributed to developing the expertise of others in the department in their use. The specific tasks performed at this level were:

- Perform analysis using PTI transmission products PSS/E and MUST
- Work with substation engineering, transmission line design and protection to design solutions
- Interface with ISO-NE and other transmission owners to obtain ISO-NE approvals
- Obtained approvals for the Killings and Barbour Hill

Power Technologies, Inc. Schenectady, NY
Assistant Vice President of Software Solutions *2001-2003*

On of my primary responsibilities at this position was to coordinate the development of PTI's primary transmission planning tools. I successfully coordinated the combined efforts of various working groups so the products appeared as coming from the same company and have common data exchange for ease of use. While doing this I continued to coordinate the profitable running of the PSS/E software. The specific tasks were:

- Defined enhancements for the PTI transmission products PSS/E, MUST and TPLAN
- Provided significant input into the development path of MUST and TPLAN
- Managed the developers contributing to these products
- Continued to provide customer engineering support on PSS/E
- Continued to contribute to development and testing of PSS/E
- Expanded these products in the role of sales, setting prices, writing proposals and negotiating with clients

Manager of Customer Support *2000-2002*

My new additional role in this position was the supervising of staff who was not engineers or computer developers. This also involved coordinating staff who previously reported to specific product managers. I was successful in transferring incoming disruptions of service requests from developers so they could be more productive. At the same time I continued to expand the PSS/E market and keep it profitable. Specific tasks were:

- Managed the first line support individuals for all PTI software products
- Managed the production and delivery personnel for all PTI software products
- Defined enhancements/new product options for the PSS/E program
- Provided engineering support for PSS/IE
- Contributed to development, documentation and development of PSS/E

PSS/E Product Manager/Senior Consultant *1990-2000*

At this time in my career I was given full responsibility for the operation of PSS/E. I successfully managed all aspects of the program so that it became the de-facto standard in the industry. This was accomplished while maintaining profitability. Specific tasks during this period were:

- Coordinated engineers, developers, computer analysts and computer operating specialists
- Handled many sales situation
- Created new program sections

- Performed software demonstrations
- Provided customer support
- Chose development path
- Established prices for PSS/E on various computer platforms.
- Continued to develop and teach PSS/E classes
- Co-authored the PSS/E Application Guide
- Investigated problems with software
- Developed software
- Wrote proposals
- Negotiated contracts
- served on consulting services review committee
- Provided final testing of software before release

Senior Engineer *1981-1990*

At this time I was assigned to the software staff and the PSS/E program. I successfully handled all assignments and continued to perform some studies for clients. Specific tasks included:

- Continued to perform power flow and stability studies
- Performed PSS/E sales demonstrations
- Wrote many dynamic models and other solution functions
- Provided *customer* support
- Wrote initial PSS/E training course and presented the course several times
- Performed testing on PSS/E software

Analytical Engineer *1973-1980*

In this position I was assigned various studies to perform for various domestic and international clients. I performed these studies well and the last year was given an assignment that resulted in my living in Brazil. The specific tasks include:

- Performed power flow studies using PSS/E
- Performed dynamic simulation and load rejection studies using PSS/E
- Performed reliability studies
- Performed shaft impact torque studies using PSS/E
- Performed generator implosion studies

Western Mass Electric Co. *Holyoke, MA*
Summer Intern 1972

- Performed distribution load flow studies and fuse coordination

EDUCATION

Master of Science, Electrical Engineering
Worcester Polytechnic Institute
Worcester, Massachusetts
June 1973 Graduate
Power System Analysis Emphasis

Bachelor of Science, Electrical Engineering
Worcester Polytechnic Institute
Worcester, Massachusetts
June 1972 Cum Laude Graduate
Humanities Minor

Power Technologies, Inc. Courses

Power System Dynamics
Automatic Generation and Control
Transmission Line Theory
Electrical Machines
Utility Economics and Financing
Reliability Techniques

TAB 12
Louise F. Mango

LOUISE F. MANGO

PHENIX ENVIRONMENTAL, INC.
3 Orange Pippin Road, Sandy Hook, CT 06482-1433
203.270.9057 (office) / 203.770.3774 (cell); phenixsh@aol.com

EDUCATION

MBA, State University of New York at Buffalo
M.S., Natural Resource Planning, Michigan State University
B.S. /B.A., Botany & Economics, Duke University

SUMMARY OF EXPERIENCE

Ms. Mango, who in 1989 founded and presently serves as President of Phenix Environmental, Inc. (Phenix), has more than 30 years of experience in conducting environmental and economic analyses for a wide range of development projects for clients in both the public and private sectors. Phenix is a state-certified, federally-registered small, woman-owned business.

Ms. Mango specializes in providing consulting services as part of multidisciplinary project teams, and excels in project coordination, report writing, environmental planning, socioeconomic / land use studies, and permitting. She has prepared and managed feasibility studies, multidisciplinary technical analyses, environmental impact evaluations, life cycle cost data, and regulatory applications for projects such as natural gas/oil transmission pipelines, electric transmission facilities (including overhead and underground transmission lines, substations, and switching stations), highways, urban redevelopments, and infrastructure facilities.

In her role as President of Phenix, she has both managed all aspects of the business (personnel, budgeting, contracting, marketing, proposal writing, report preparation), and successfully led a wide variety of technical studies. Prior to forming Phenix, Ms. Mango spent 12 years at Ecology & Environment, Inc., where she held positions of increasing management responsibility, performing and supervising comprehensive projects for clients such as the U.S. Navy, U.S. Environmental Protection Agency, urban redevelopment / economic development groups, and a variety of energy development companies. She has been involved in projects in Connecticut since 1986, and has conducted environmental / socioeconomic studies and construction monitoring for the Connecticut Siting Council (Council), and has prepared and supported detailed applications to the Council on behalf of various private utility companies.

Ms. Mango brings to all of her work a unique combination of management proficiency and practical, hands-on experience in ecologically-sound project development. She has managed or performed work in a wide variety of environmental areas, including wetland studies, stormwater permitting, cultural resource analyses, coastal zone consistency review, biological studies, land use/socioeconomic evaluations, visual resource investigations, construction oversight and monitoring, and hazardous materials management. She also has routinely worked as part of project teams to prepare detailed project feasibility studies, alternatives analyses, capital cost assessments, constructability reviews, environmental permit applications, and construction monitoring plans.

She has served as an expert environmental witness before various energy siting boards, including the Council and the New York State Public Service Commission, and also was the designated natural gas transmission pipeline industry representative to the Connecticut Governor's Task Force on Long Island Sound (in 2002-2003). As part of her work on the Task Force, Ms. Mango evaluated the feasibility of alternatives to traditional energy sources, including wind energy, resource recovery, photovoltaics, and fuel cells, as well as methods to reduce the demand for energy through conservation, load management, and demand response programs.

In addition, Ms. Mango has decades of experience in providing environmental input to and/or managing the preparation of federal, state, and local permit applications, and has served as the project manager for scores of Environmental Impact Statements (EISs), Environmental Assessments (EAs) and Environmental Reports (ERs). She has assisted clients in submitting applications for U.S. Army Corps of Engineers (USACE) Section 10/404 permits, state coastal zone consistency and water resource management agencies approvals (Section 401 water quality certifications, storm water management permits), and cultural resource approvals (from State Historic Preservation Offices and the Advisory Council on Historic Preservation).

She also has supervised the preparation and implementation of various special mitigation and monitoring plans, for both linear energy developments and other facilities. These have included detailed D&M plans; wetland survey and multi-year (post-construction) monitoring plans; Spill Prevention, Control, and Countermeasure (SPCC) plans; cultural resource surveys and data recovery/public education plans; endangered species surveys and mitigation plans; visual impact mitigation programs; invasive species (vegetation) control plans; erosion/sediment control and revegetation plans; and right-of-way (ROW) management plans.

REPRESENTATIVE PROJECT EXPERIENCE

GENERAL ANALYSES

Environmental Life Cycle Cost Study, CT: Under subcontract to Acres International, an engineering firm working directly for the Council, prepared environmental and land use portions of life cycle cost and environmental externalities study of construction and operation of 115-kV electric transmission lines (overhead vs. underground). Consulted with representatives of major Connecticut electric transmission utilities; reviewed representative environmental conditions along major transmission corridors in different geographic regions of Connecticut; and researched availability and effectiveness of environmental externality and life cycle costing models in general. In conjunction with transmission engineers, prepared a concise report that evaluated costs and benefits of different transmission line configurations and recommended methods for better incorporating environmental costs into utility project planning and evaluation.

Task Force on Long Island Sound, Hartford, CT: Served as interstate natural gas transmission industry representative to Governor Rowland's Task Force. Participated in Task Force meetings and discussions, and assisted in the preparation of a final assessment report (issued June 2003) concerning Long Island Sound's resources and existing and future energy infrastructure development and energy options in Connecticut. Work included detailed inventories of Long Island Sound resources and potential impacts as a result of energy development, as well as the review of alternative energy options, including different types of energy (e.g., wind, fuel cells, photovoltaics) and demand side energy management and conservation programs.

ELECTRIC TRANSMISSION LINES

Interstate Reliability Project, CT, MA, and RI: On behalf of Northeast Utilities (NU), coordinated with corporate counsel and Project engineers and environmental consultants to compile overall systems alternatives analyses of different transmission system options in CT, MA, and RI; assisted in the preparation of the Project Municipal Consultation Filing (MCF) and Supplemental MCF. Also coordinated the completion of portions of the 2011 Council Application and conducted various field reviews of the Project area, including of alternative routes. Ms. Mango is currently assisting NU in compiling the Project application to the USACE for a Section 404 permit, coordinating with representatives of National Grid and others on the NU Project team. In addition, she is coordinating work on the preparation of an Environmental Assessment, as required by the USACE, regarding the proposed easement expansion across 1.4 miles of USACE-owned land in the Mansfield Hollow area (Towns of Mansfield and Chaplin, CT).

Greater Springfield Reliability Project (GSRP), CT and MA and Manchester to Meekville Project (MMP), CT: On behalf of NU, worked with the Project engineering team and legal advisors to prepare 345-kV and 115-kV Project environmental and alternatives analyses, as well as in the preparation and review of environmental portions of Municipal Consultation Filings and Applications to the Council and to the Massachusetts Energy Facilities Siting Board (EFSB). Conducted field reconnaissance of alternative routes, including underground and overhead configurations for both the 345-kV and 115-kV components. Served as expert environmental witness during testimony before the Council and in joint hearings before the Council and the EFSB. Also prepared environmental portions of Findings of Fact for the Council, as well as legal briefs for the Council and the EFSB. During Project construction, Ms. Mango serves on the GSRP/MMP compliance team and, in that role, developed environmental training tools for Project personnel (environmental handbook, focus area fact sheets, basic and supervisory environmental training modules); coordinates with others regarding the compliance of construction activities with applicable federal, state, and local permits; and assists Project construction personnel as necessary. She also coordinated with the Project team to update the Compliance Action Plan for the GSRP and MMP.

Application, Expert Witness, and Council and Stormwater Environmental Inspector, Glenbrook Cables Project, CT: Provided consulting services to The Connecticut Light and Power Company (CL&P) and subsequently to Burns & McDonnell, Inc. for all environmental aspects of the project, including the Council's required Municipal Consultation Filing and subsequent application for the construction and operation of a new, 8.9-mile 115-kV underground cable system, aligned within congested urban areas of Norwalk, Darien, and Stamford. Conducted environmental analyses; attended open houses concerning the project; and prepared sections of the application. Prepared responses to interrogatory questions; drafted pre-filed testimony; served as an expert witness during hearings; and assisted in the preparation of CL&P's Finding of Fact and brief. In addition to the Council process, coordinated with other involved agencies, and compiled data for permit application submissions to the USACE and the Connecticut Department of Environmental Protection (CTDEP). Subsequently, performed environmental inspections on behalf of the Council. Work included inspection for compliance with stormwater pollution control requirements, as well as with federal and state permit conditions. Provided weekly inspection reports, over a 2.5-year period.

Middletown – Norwalk Electric Transmission Project, CT: Provided consulting services to CL&P and The United Illuminating Company (UI) during the preparation of a municipal consultation filing and then an application to the Council for the construction and operation of a new 69-mile 345-kV transmission line to serve southwest Connecticut. Performed environmental analyses; compiled environmental and other sections of the Council application; provided expert witness testimony; and

assisted in the preparation of project applications for other state and federal permits, including those from the USACE and CTDEP Office of Long Island Sound Programs (OLISP) for crossings of the coastal resources in lower Fairfield County, including the Housatonic, Pequonnock, and Saugatuck rivers. Provided expert environmental witness testimony during adjudicatory hearings before the CTDEP regarding the navigable river crossings. After the Project was approved, worked under the direction of the Council in conducting weekly inspections of electric transmission line construction sites to assess compliance with Connecticut environmental requirements, including the *2002 Connecticut Soil and Erosion Control Guidelines*. Work spanned two years and included site inspections throughout the route of the underground transmission line in Bridgeport and Stratford, as well as the preparation of weekly compliance reports (accompanied by photographic documentation) that were submitted to the Council and to the involved municipalities.

Bethel – Norwalk 345 kV Transmission Project, CT: For the 345 kV transmission line between Bethel and Norwalk, worked for CL&P (2001 – 2003) on the preparation and support of select portions of the Council application. Assessed project need and prepared descriptions of effects of project on New England power grid and on provision of new capacity to southwestern Connecticut. Conducted analyses of consistency of project with local land use plans, provided technical input on environmental matters during testimony before the Council and assisted in preparation of Findings of Fact and project brief.

PIPELINES

Millennium Pipeline Project, NY: For this interstate natural gas pipeline project traversing New York State's Southern Tier and Hudson River Valleys, served as a management and environmental consultant to the Vice President and Construction Manager. As part of a team comprised of both pipeline construction experts and environmental specialists, in 1999 and again in 2005-2009, conducted independent reviews of permit applications, environmental data, engineering plans, material procurement scenarios, and budgeted costs for the planned construction of the original Millennium Project, a 400-mile natural gas pipeline that was proposed for location across Lake Erie and the Southern Tier of New York. For the 1999 project sponsors, prepared a confidential report that detailed the results of the review. After project was delayed and then modified to include a phased construction schedule, re-hired (2005) by the new Millennium partnership to conduct studies of the new 181-mile project. Over a four-year period, provided assistance prior to, during, and after natural gas pipeline installation. Reviewed and assisted in the development of environmental field studies, construction plans, and mitigation assessments. Coordinated with the project team to update Environmental Construction Standards to reflect the conditions of federal and state permits and approvals. Worked with construction engineers to prepare detailed plans and contingency approaches for 13 horizontal directional drills of major rivers and wetland complexes; assisted in the design of a variance approval process to facilitate agency approvals of construction modifications; and prepared various detailed plans, such as for the pipeline installation and restoration across the Appalachian Trail and the black dirt (peat) areas of Orange County. Also evaluated the potential effects of a proposed High Voltage DC line (the New York Regional Interconnect), which was proposed to follow portions of the Millennium pipeline right-of-way.

Environmental Field Studies and Permitting for Pipelines, Dutchess and Orange Counties, NY: For two proposed natural gas pipelines, including one involving a crossing of the Hudson River, conducted stream and wetland surveys, compiled environmental data, and assisted in preparation of technical portions of applications for permits and certificates (e.g., USACE Section 10/404, NYSPSC Article VII, coastal zone consistency certification, 401 water quality certification). Worked with project engineers to develop an EM & CP, which specified methods for the Hudson River crossing, as

well as for other stream and wetland crossings. All permits and approvals were obtained in a timely manner and the project was successfully completed on schedule.

Yankee Gas Services Meriden Pipeline Project Council Development & Management (D & M) Plan, CT: Coordinated the preparation of a Development & Management (D&M) Plan for Yankee Gas's 4-mile natural gas pipeline in the communities of Southington, Berlin, and Meriden. The D&M Plan was required by the Council, as a condition of that agency's approval of the pipeline project. Successfully completed the D&M Plan in accordance with Yankee Gas's schedule, which required the preparation of and Council approval of the Plan within less than 90 days. .

NY-NJ Pipeline Lateral Project, New York City Metropolitan Area: As part of an engineering – environmental team providing third-party services for three major energy companies, analyzed and provided a report concerning two competing pipeline proposals for providing additional natural gas supplies to New York City in order to relieve current pipeline capacity constraints, which become critical during periods of high load. Reviewed and compared the two different pipeline lateral proposals based on overall conformance with the companies' objectives for providing additional gas deliveries to lower Manhattan and for increasing the diversity of natural gas supply sources to the region, taking into consideration factors such as risk, cost, environmental / regulatory (permitting) issues, construction engineering considerations, and scheduled in-service date. As part of these analyses, met with representatives of the competing pipeline lateral teams to review the technical aspects of each proposal and to obtain information regarding proposed construction methods, timing, cost, environmental / regulatory issues, and the status of public / agency outreach efforts; conducted separate field reconnaissance reviews of the proposed pipeline lateral routes and route alternatives; performed research and evaluations regarding potential construction, environmental, and permitting issues and risks associated with each proposal; and examined and compared estimated capital costs. Presented the results of the analyses to the companies in a detailed written report.

Feasibility Study of Transmission Pipeline Lateral for Marcellus Shale Gas: Northern PA and Southern NY: Working for an energy development firm, provided initial routing, environmental, and regulatory analyses to evaluate the feasibility of developing a gathering system and transmission pipeline lateral to transport Marcellus Shale gas from various locations in north-central Pennsylvania to existing interstate natural gas transmission pipeline systems in southern New York State and central Pennsylvania. Evaluated routing considerations, environmental requirements, potential interconnection (delivery) points, and schedule issues as part of the development of a general critical path schedule designed to assist project decision-making.

Vector Pipeline Corridor Environmental Screening/Audit and Capital Cost Variance Review, IL, IN, MI: From 1997 through mid-2002, worked with project partners to evaluate various aspects of the Vector project. Initially, performed a third-party environmental review of the pipeline route that was designed to follow an existing oil pipeline right-of-way through three states. Conducted a route reconnaissance to verify land use patterns and environmental features, and worked with engineers to suggest alternatives to avoid or minimize impacts to features such as large wetland complexes and new residential areas. Reviewed all initial environmental studies, including soil erosion/sedimentation control and SPCC plans, and made recommendations to clarify the company's proposed construction techniques to regulators involved in the permitting process. During project construction, conducted a capital cost variance analysis to identify reasons for cost growth and worked with Vector engineering, environmental, and right-of-way personnel to control costs through remainder of construction. Analyzed and provided recommendations concerning cost control, payments for contractor extra work requests, and contractor settlements. Conducted in-depth examination of costs in all project management areas and prepared a detailed cost variance report that

pinpointed the principal causes of cost growth and made recommendations concerning methods to control costs on future similar projects.

Portland Natural Gas Pipeline, VT, NH, ME, MA: As a subcontractor to a specialized construction engineering consultant, reviewed environmental specifications and construction documents to assess potential concerns with respect to project schedule, environmental non-compliance, and cost control. Evaluated construction and environmental mitigation plan for continued pipe installation activities during winter months. Provided estimates of environmental critical path schedule and permitting requirements for new laterals in MA.

INEX Pipeline Feasibility Study, NY, VT, NH, MA: Supervised environmental feasibility studies of a new pipeline system to bring additional natural gas to markets in the Northeastern United States (the Boston area). Conducted field review, consulted with potentially involved agencies, compiled baseline environmental data, performed routing studies, assessed potential environmental study requirements and costs, and prepared a critical path environmental/permitting report.

Iroquois Gas Transmission System, NY, CT: As an environmental consultant to the gas transmission company, provided and coordinated environmental studies prior to, during, and after gas facility construction. Prepared initial FERC, Council, and NYSPSC environmental reports (project team organization, client consultation, agency consultation to compile data, public meetings), alternatives analyses of environmental features, coastal zone consistency reviews, FERC resource reports, and state agency environmental submissions/testimony; worked with the gas company to coordinate special field studies (e.g., biological and visual resource studies, $9 million cultural resource program); and assisted in the preparation of various federal and state environmental permit applications. Provided expert environmental testimony, over a span of years, as part of Council and NYSPSC proceedings. Worked with gas company engineers to develop special plans, including three separate D & M Plans for portions of the gas pipeline project in CT and seven Environmental Management & Construction Plans for NY portion of project. In addition, coordinated development of other special plans both during and post-construction (e.g., erosion and sediment control, SPCC, invasive species control, ROW maintenance, agricultural/crop productivity monitoring program).

TAB 13
Jeffrey R. Martin

Jeffrey R. Martin

Professional History
- Northeast Utilities (Jun 2004 – Present)
- ENSR International (Sep 2001 – Jun 2004)
- Environmental Science Services, Inc. (Mar 1998 – Sep 2001)
- Massachusetts Department of Environmental Protection (Dec 1987 – Mar 1998)

Education
- BS (Mechanical Engineering) University of New Hampshire – Dec 1987

Technical Specialties
Mr. Martin has over 24 years of experience managing energy and land development projects. Areas of expertise include:
- Energy, Land and Coastal Development Project Planning
- Local, State, Regional and Federal Environmental and Regulatory Permitting
- Development and Execution of Environmental Impact Studies
- Preparation of Environmental Impact Reports/Statements
- Development of Regulatory Permitting Strategies
- Development of Agency, Public and Stakeholder Outreach Programs
- Navigational Impact Assessments

Background
Mr. Martin is a Project Manager in the Transmission Group at Northeast Utilities (NU) in Berlin, Connecticut, and also serves as the Manager of Permitting and Compliance for NU's NEEWS Program. He manages all facets of transmission project development, including siting and permitting, construction, and environmental/permit compliance. Prior to joining NU, Mr. Martin served as a Project Manger for two environmental consulting firms, ESS Group in Wellesley, MA and ENSR International in Westford, MA. In these positions, Mr. Martin managed development projects for a wide array of clients, providing environmental services such as feasibilities studies, siting and permitting, environmental assessments, and development of mitigation strategies. Mr. Martin is also a former Program Chief for the Massachusetts Department of Environmental Protection (DEP) Chapter 91 Waterways Program, where he spent 11 years gaining extensive experience in planning and permitting a wide range of coastal projects, including submarine cables and pipelines. Mr. Martin offers a current and thorough understanding of many local, regional, state and federal regulatory processes, and has established and maintained valuable working relationships with key decision-making personnel at many of these Agencies. Mr. Martin1s areas of regulatory expertise include: Section 10/404 permitting by the U.S. Army Corps of Engineers; Coastal Zone Management Consistency Certification; coastal permitting programs in CT and MA; and 401 Water Quality Certification.

Representative Project Experience

ENERGY PROJECTS:

Greater Springfield Reliability Project (GSRP) – Served as the Permit Manager for GSRP, managing a team of regulatory and environmental specialists in the preparation of numerous local, state and federal permit applications for this 2-State (MA and CT) Project. Provided oversight of environmental studies and assessments, preparation of all filing documents, attendance and presentation at numerous public and agency meeting/hearings, development of compensatory mitigation strategies and plans, and direct negotiation of permit conditions. Currently serving at the Compliance Manager for GSRP, directing a team of over 20 environmental inspectors and monitors responsible for ensuring compliance with a multitude of siting and permit authorizations for the Project.

Agawam to West Springfield Circuit Separation Project (AWSP) – Project Manager for the AWSP, which involves the reconstruction or two (2) existing 115-kV circuits between Western Massachusetts Electric Company's (WMECO's) Agawam and West Springfield Substation, along a 2.5 mile right-of-way. Responsibilities include management and oversight of all project activities including: budget management and oversight; obtaining state and federal regulatory approvals (including siting and environmental permits); public, stakeholder, and regulatory agency outreach and coordination; and construction oversight.

Long Island Replacement Cable (LIRC) – Replacement of and Existing Submarine Cable System between Norwalk, CT and Northport, Long Island. Serving as Project Manager for the proposed replacement of a seven-cable electric transmission system between Connecticut and Long Island, New York. The new transmission system will be a three-cable system capable of operating at the same capacity as the existing system (300 MVA), while providing distinct environmental benefits as compared to the existing system. Responsibilities include management and oversight of all project activities including: budget management and oversight; obtaining state and federal regulatory approvals (including siting and environmental permits); public, stakeholder, and regulatory agency outreach and coordination; and construction oversight.

Miscellaneous Replacement and Maintenance Projects, Connecticut and Massachusetts. Served as Project Manager for numerous electric transmission system replacement and maintenance projects. Examples include replacement of existing shield wire systems in both MA and CT, and CCVT and lightening arrestor replacements at substation facilities throughout the Northeast Utilities service territory. Responsibilities include project budget management and reporting; obtaining local and state permits; coordination with stakeholder agencies (e.g., road, highway, and railway authorities); and construction oversight.

Oxford Substation Project, Oxford, Massachusetts. Serving as Project Manager for development of a new electric transmission and distribution substation in Oxford, CT. This substation numerous electric transmission system replacement and maintenance projects. Examples include replacement of existing shield wire systems in both MA and CT, and CCVT and lightening arrestor replacements at substation facilities throughout the Northeast Utilities service territory. Responsibilities include project budget management and reporting; obtaining local and state permits; coordination with stakeholder agencies (e.g., road, highway, and railway authorities); management of engineering and design efforts; and construction oversight.

Confidential Projects, Massachusetts and Connecticut. Currently serving as Project Manager for numerous reliability-driven transmission projects in MA and CT. These projects include development of new transmission lines, reconductoring and rebuilding existing transmission lines, and modifications at numerous substation facilities. Responsibilities include coordination of system planning efforts with internal and external team members; development of siting and

permitting strategies, project schedule development, and management of engineering and design efforts.

Cape Wind Associates, LLC – Offshore Renewable Energy Generation and Submarine Cable Project, Massachusetts. Served as Project Manager for a proposed renewable energy generation project involving up to 195 offshore wind turbines with a potential to generate 420 MW of electricity. The proposed wind farm is sited on Horseshoe Shoal in Nantucket Sound and will interconnect with the regional power grid through an AC submarine cable to the southern shore of Cape Cod. Responsibilities included management and oversight of all project activities; preliminary siting and alternative analyses; development of public and regulatory agency outreach programs; environmental impact analyses; and local, regional, state and federal permit acquisition.

Generation Ventures Associates - Electric Generation Facility, Brockton, MA. Served as Project Manager for the development and permitting of a gas-fired electrical generating facility in Brockton, Massachusetts. Responsibilities include the acquisition of applicable environmental permits, including a Wetlands Order of Conditions from the Brockton Conservation Commission and the preparation and filing of an Environmental Notification Form (ENF) with the Massachusetts Environmental Protection Act (MEPA). Oversight of the development and execution of technical and environmental studies associated with the preparation of an Environmental Impact Report (EIR) and representation of the Client during the MEPA review process.

PG&E Generating – 1,100 MW Gas-Fired, Combined Cycle Independent Power Plant, Athens, NY. Provided environmental consulting services for the siting and preparation of regulatory filings for a new 1,100 MW natural gas-fired power plant near the Hudson River. Mr. Martin conducted a navigational impact assessment associated with the construction of intake and discharge pipes within the Hudson River for cooling tower makeup. Mr. Martin was also involved in critically reviewing the intake/discharge facility design, including dredging components and regulatory feasibility. This plant is planned to be operational in 2001.

National Grid USA (Massachusetts Electric Company) – Electric Transmission Cable, Harwich, MA. Served as Project Manager for the preparation and filing of a Notice of Intent pursuant to the Massachusetts Wetlands Protection Act for the installation of an electric transmission cable and conduits in Harwich, Massachusetts. Represented the Client before the Harwich Conservation Commission and negotiated special permit conditions to ensure that manhole de-watering activities would have no adverse impact on adjacent wetland resource areas.

National Grid USA (Nantucket Electric Company) - Beach Nourishment Project, Harwich, MA. Served as Project Manager for the performance of technical studies examining the causes of extensive coastal erosion at NEC shorefront property in Harwich, Massachusetts. Proposed and assisted in the design of a 3,000 cubic yard beach nourishment program. Applied for and obtained local, state and federal permits for the project, and represented the Client before the Harwich Conservation Commission. Negotiated special permit conditions with the Conservation Commission and supervised the development and implementation of a coastal bank and beach grass planting plan.

NSTAR Services – Acushnet River Submarine Cable Crossing, Acushnet and New Bedford, MA. Served as Project Manger for installation of one (1) new a 115 kV submarine electric transmission line, and the relocations of fourteen (14) existing submarine cables across the Acushnet River. Responsibilities also included preparation and submission of regulatory permit applications, and representation of the Client before the regulatory agencies at public hearings and meetings. Also played advisory role on committee convened by the U.S. Army Corps of Engineers and USEPA to address potential project impacts associated with the New Bedford Superfund Project.

NSTAR Services – Electric Transmission Cable/Conduit Installation, Roadway Installations, New Bedford, MA. Served as Project Manger for installation of one (1) new a 115 kV electric transmission line and several cable conduits within existing roadway alignments in New Bedford. Responsibilities also included preparation and submission of regulatory permit applications, and representation of the Client before the regulatory agencies at public hearings and meetings.

NSTAR Services – Pine Hills Gas Pipeline Project, Plymouth, MA. Served as Project Manger for installation of a new 12–inch diameter natural gas pipeline to supply the Pine Hills residential development project in Plymouth, Massachusetts. Responsibilities also included preparation and submission of regulatory permit applications (MEPA-ENF and Notice of Intent), and representation of the Client before the regulatory agencies at public hearings and meetings.

AMERESCO, Inc. – Landfill Gas to Energy Project, Proposed Gas Pipeline Feasibility and Siting Evaluation, Chicopee and Springfield, MA. Conducted a regulatory applicability and constraints analysis, and alternative routing evaluation for a proposed 8-inch diameter gas pipeline project. The proposed pipeline will originate at an existing landfill site in Chicopee, Massachusetts, and will be routed across the Massachusetts Turnpike and Chicopee River, to a potential electric generation facility in Springfield, Massachusetts.

Keyspan Energy/Northeast Utilities – Multiple Submarine Cable Replacement Project, Long Island Sound, Connecticut and Long Island, NY. Served as Task Manger for regulatory permitting of the proposed removal and replacement of several submarine electric transmission cables from Connecticut to Long Island, New York. Responsibilities include preparation of relevant portions of the Connecticut Siting Council Application, State Office of Long Island Sound Programs, U.S. Army Corps of Engineer Sections 10 and 404 permitting, and municipal agency filings.

TransEnergie, Cross Sound Cable Project – Proposed Submarine Cable Crossing of Long Island Sound, Connecticut to Long Island, NY. Prepared alternative submarine cable routing analysis in response to mandates received by the Connecticut Siting Council. Alternative routing analysis was based on the results of comprehensive geological investigations, compatibility of potential substation landfalls in Connecticut, and economic feasibility studies conducted by others.

Commonwealth Electric Company - Martha1s Vineyard Cable Project, Falmouth to Tisbury, MA. While at MADEP, Mr. Martin served as the Program lead for regulatory review and permitting of the submarine power cable from mainland Cape Cod to the island of Martha1s Vineyard. Responsibilities included detailed Chapter 91 regulatory review and compliance assessment, environmental impact review, navigational impact assessment and extensive inter-agency and municipal coordination.

Nantucket Cable Electric Company, Inc., Nantucket Cable Project, Harwich to Nantucket, MA. While at MADEP, Mr. Martin served as the Program lead for regulatory review and permitting of the submarine power cable from mainland Cape Cod to the island of Nantucket. Responsibilities included detailed Chapter 91 regulatory review and compliance assessment, environmental impact review, navigational impact assessment and extensive inter-agency and municipal coordination.
Miscellaneous Electric Transmission and Pipeline Projects. Over 11-year tenure with MADEP, played either a Program lead and regulatory staff review role on multiple transmission and pipeline projects throughout Massachusetts. Nature of role on such projects included Chapter 91 regulatory review and compliance assessment, environmental impact review, navigational impact assessment and inter-agency and municipal coordination. A list of representative project proponents is provided below.

- NEES/Massachusetts Electric
- Commonwealth Electric Company

- Commonwealth Gas Company
- Boston Gas Company
- Boston Edison Company
- Algonquin Gas Company
- Tennessee Gas and Transmission Company

OTHER DEVELOPMENT EXPERIENCE:

New Bedford Oceanarium Corporation – Aquarium Development, New Bedford, Massachusetts. Serving as Project Manager for the redevelopment of former Manufactured Gas and Power Plant Site along the Harbor Waterfront in New Bedford. The Project includes the renovation of a former power plant building into a state-of-the-art aquarium, education and research facility, with on-site parking and numerous exterior amenities, features and water-based uses. Responsibilities include oversight and management of site planning and design efforts, environmental impact assessments, and regulatory permitting. Permitting efforts include local planning board and conservation commission review (wetlands permitting), demonstrated compliance with the New Bedford Harbor Plan, Chapter 91 License Application, MEPA review, and U.S. Army Corps of Engineers permitting.

Down Island Golf Club, Inc. - Comprehensive Environmental Consulting and Engineering Services, Golf Course Development Project, Oak Bluffs, Massachusetts. Serving as Project Manager for the development and permitting of a private 18-hole golf course on Martha1s Vineyard, Massachusetts. Responsibilities include management of a $2 million contract, oversight and coordination of environmental impact assessments, as the acquisition of applicable local, regional, state and federal permits. Applicable permits include those issued by various municipal agencies, the Water Management Act Permit issued by the Massachusetts Department of Environmental Protection (DEP), Martha1s Vineyard Commission review as a Development of Regional Impact (DRI), and Massachusetts Environmental Protection Act (MEPA) review.

Developers Diversified Realty Corporation - Commercial Retail Development, Everett, Massachusetts. Serving as Project Manager for the Gateway Center Redevelopment project, and traffic safety improvements to Santilli Circle (Route 16), in Everett, Massachusetts. Responsibilities include site planning services, permit acquisition pursuant to M.G.L. Chapter 91, and review under the Massachusetts Environmental Protection Act (MEPA).

State Street Bank Realty Trust - Chapter 91 Jurisdictional Assessment. Conducted a M.G.L. Chapter 91 jurisdictional assessment for an existing office park on filled tidelands in Quincy, Massachusetts. Responsibilities included research of existing historical information on file with the Department of Environmental Protection1s Waterways Regulation Program, interpretation of the location of the historic mean high water shoreline, and an assessment of regulatory compliance for the existing structures and uses on the project site.

Boston Gas Company - Chapter 91 Jurisdictional Assessment and Application. Conducted a M.G.L. Chapter 91 jurisdictional assessment for an industrial property on filled and flowed tidelands of Boston Harbor/Neponset River in Dorchester (Boston), Massachusetts. Results of this assessment were utilized in the preparation of a Chapter 91 Waterways License Application which has been filed with the Massachusetts Department of Environmental Protection. The application is pending.

TAB 14
Anthony P. Mele

Anthony P. Mele

PROFESSIONAL EXPERIENCE

2007 – Present **Project Manager, Interstate Reliability Project**
Northeast Utilities, Berlin, CT
Management responsibility over all aspects of the Interstate Reliability Project, including engineering, risk analysis and mitigation, siting and permitting, budget, schedule, contracting and closeout.

1999 - 2006 **Originator, Wholesale Marketing;**
Select Energy, Inc., Berlin, CT
Responsible for originating physical and financial transactions with counterparties in the New England Power Pool. Develop and maintain both counterparty relationships and in-depth understanding of regulatory rules and dynamics. Work closely with Portfolio Management, Credit and Risk Management and Legal to balance achievement of sales goals and management of credit and contractual risk.

1994-1998 **Account Manager, Wholesale Power Marketing;**
Northeast Utilities, Berlin, CT
Responsible for identifying, structuring and closing sales opportunities to New England wholesale power market participants.

1989-1994 **Senior Financial Analyst, Treasury and Accounting Departments;**
Northeast Utilities, Berlin, CT
Responsible for varied financial and economic analyses associated with NU's Treasury and Accounting Departments.

1981-1989 **Senior Engineer, Generation Engineering Department;**
Northeast Utilities, Berlin, CT
Project engineer overseeing the design and installation of various process and HVAC equipment in the NU System generating facilities.

EDUCATION

M.B.A. Finance, University of Connecticut, West Hartford, Connecticut, 1991

B.S. Chemical Engineering, University of New Hampshire, Durham, New Hampshire, 1981

TAB 15
Judah L. Rose

JUDAH L. ROSE

EDUCATION

1982 M.P.P., John F. Kennedy School of Government, **Harvard University**

1979 S.B., Economics, **Massachusetts Institute of Technology**

EXPERIENCE

Judah L. Rose joined ICF in 1982 and currently serves as a Managing Director of ICF International. Mr. Rose has 30 years of experience in the energy industry. Mr. Rose's clients include electric utilities, financial institutions, law firms, government agencies, fuel companies, and IPPs. Mr. Rose is one of ICF's Distinguished Consultants, an honorary title given to three of ICF's 3,500 employees, and has served on the Board of Directors of ICF International as the Management Shareholder Representative.

Mr. Rose has supported the financing of tens of billion dollars of new and existing power plants and is a frequent counselor to the financial community.

Mr. Rose frequently provides expert testimony and litigation support. Mr. Rose has provided testimony in over 100 instances in scores of state, federal, international, and other legal proceedings.

Mr. Rose has also addressed approximately 100 major energy conferences, authored numerous articles published in Public Utilities Fortnightly, the Electricity Journal, Project Finance International, and written numerous company studies. Mr. Rose has also appeared in TV interviews.

Mr. Rose received a M.P.P. from the John F. Kennedy School of Government, Harvard University, and an S.B. in Economics from the Massachusetts Institute of Technology.

PRESS INTERVIEWS

TV: "The Most With Allison Stewart," MSNBC, "Blackouts in NY and St. Louis & ongoing Energy Challenges in the Nation," July 25, 2006
CNBC Wake-Up Call, August 15, 2003
Wall Street Journal Report, July 25, 1999
Back to Business, CNBC, September 7, 1999

Journals: Electricity Journal
Energy Buyer Magazine
Public Utilities Fortnightly
Power Markets Week

Magazine: Business Week
Power Economics
Costco Connection

Newspapers: Denver Post
Rocky Mountain News
Financial Times Energy
LA Times
Arkansas Democratic Gazette
Galveston Daily News
The Times-Picayune
Pittsburgh Post-Gazette
Power Markets Week

Wires: Bridge News
Associated Press
Dow Jones Newswires

TESTIMONY

113. Direct Testimony, Southwestern Electric Power Company, In the Matter of Southwestern Electric Power Company's Petition for a Declaratory Order Finding That Installation of Environmental Controls at the Flint Creek Power Plant is in the Public Interest, Docket No. 12-008-U, February 9, 2012.

112. Rebuttal Testimony, Otter Tail Power Company, Before the Office of administrative Hearings, for the Minnesota Public Utilities Commission, In The Matter of Otter Tail Power Company's Petition for an Advance Determination of Prudence for its Big Stone Air Quality Control System Project, September 7, 2011.

111. Rebuttal Testimony, on behalf of Arizona Public Service, In the Matter of the Application of Arizona Public Service Company for Authorization for the Purchase of Generating Assets from Southern California Edison, and for an Accounting Order, Docket No. E-01345A-10-0474, June 22, 2011.

110. Direct Testimony, Duke Energy Ohio, Inc., Application of Duke Energy Ohio for Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Revised Code, in the Form of an Electric Security Plan, Accounting Modifications and Tariffs for Generation Service, Case No. 11-XXXX-EL-SSO. Application of Duke Energy Ohio for Authority to Amend its Certified Supplier Tariff, P.U.C.O. No. 20. Case No. 11-XXXX-EL-ATA. Application of Duke Energy Ohio for Authority to Amend its Corporate Separation Plan. Case No. 11-XXXX-EL-UNC, June 20, 2011.

109. Direct Testimony, Manitoba Hydro Power Sales Contracting Strategy, U.S. Power Markets, Manitoba Hydro Drought Risks, Modeling, Forecasting and Planning, Selected Risk and Financial Issues, Governance, Trading and Risk Related Comments Before the Public Utilities Board of Manitoba, February 22, 2011.

108. Surrebuttal Testimony – Revenue Requirement of Judah Rose on Behalf of Dogwood Energy, LLC, In the Matter of the Application of KCP&L Greater Missouri Operations Company for Approval to Make Certain Changes to its Charges for Electric Service, Case No. ER-2010-0356, January 12, 2011.

107. Rebuttal Report Concerning Coal Price Forecast for the Harrison Generation Facility, Meyer, Unkovic and Scott, LLP, filed December 6, 2010.

106. Direct Testimony of Judah Rose on behalf of Duke Energy Ohio In the Matter of the Application of Duke Energy Ohio for Approval of a Market Rate Offer to Conduct a Competitive Bidding Process for Standard Service Offer Electric Generation Supply, Accounting Modifications, and Tariffs for Generation Service, Case No. 10-2586-EL-SSO, filed November 15, 2010.

105. Updated Forecast, Coal Price Report for the Harrison Generation Facility, Meyer, Unkovic and Scott, LLP, filed October 18, 2010.

104. Declaration of Judah Rose in re: Boston Generating LLC, et al., Chapter 11, Case No. 10-14419 (SCC) Jointly Administered, September 29, 2010.

103. Declaration of Judah Rose in re: Boston Generating LLC, et al., Chapter 11, Case No. 10-14419 (SCC) Jointly Administered, September 16, 2010.

102. Direct Testimony of Judah Rose on behalf of Plains and Eastern Clean Line LLC, in the Matter of the Application of Plains and Eastern Clean Line Oklahoma LLC to conduct Business as an Electric Utility in the State of Oklahoma, Cause No.PUD 201000075, July 16, 2010.

101. Direct Testimony of Judah Rose on behalf of Plains and Eastern Clean Line LLC, in the Matter of the Application of Plains and Eastern Clean Line LLC for a Certificate of Public Convenience and Necessity to Operate as an Electric Transmission Public Utility in the State of Arkansas, Docket No. 10-041-U, June 4, 2010.

100. Supplemental Testimony on Behalf of Entergy Arkansas, Inc., In the Matter of Entergy Arkansas, Inc., Request for a Declaratory Order Approving the Addition of the Environmental Controls Project at the White Bluff Steam Electric Station Near Redfield, Arkansas, Docket No. 09-024-U, July 6, 2009.

99. Rebuttal Testimony on Behalf of TransEnergie, Canada, Province of Quebec, District of Montreal, No.: R-3669-2008-Phase 2, FERC Order 890 and Transmission Planning, July 3, 2009.

98. Surrebuttal Testimony – Revenue Requirement of Judah Rose on Behalf of Dogwood Energy, LLC, before the Missouri Public Service Commission, In the Matter of the Application of KCP&L GMO, Inc. d/b/a KCP&L Greater Missouri Operations Company for Approval to Make Certain Changes to its Charges for Electric Service, Case No. ER-2009-0090, April 9, 2009.

97. Hawaii Structural Ironworkers Pension Trust Fund v. Calpine Corporation, Case No. 1-04-CV-021465, Assessment of Calpine's April 2002 Earnings Projections, March 25, 2009.

96. Coal Price Report for Harrison Coal Plant, Allegheny Energy Supply Company, LLS and Monongahela Power Company versus Wolf Run Mining Company, Anker Coal Group, etc., Civil Action. No. GD-06-30514, In the Court of Common Pleas, Allegheny County, Pennsylvania, February 6, 2009.

95. Supplemental Direct Testimony of Judah Rose, on behalf of Southwestern Electric Power Company, In the Matter of the Application of Southwestern Electric Power Company for Authority to Construct a Natural-Gas Fired Combined Cycle Intermediate Generating Facility in the State of Louisiana, Docket No. 06-120-U, December 9, 2008.

94. Rebuttal Testimony of Judah Rose on behalf of Kelson Transmission Company, LLC re: Application of Kelson Transmission Company, LLC For A Certificate of Convenience and Necessity For the Amended Proposed Canal To Deweyville 345 kV Transmission Line Within Chambers, Hardin, Jasper, Jefferson, Liberty, Newton, And Orange Counties, SOAH Docket No. 473-08-3341, PUCT Docket No. 34611, October 27, 2008.

93. Testimony of Judah Rose, on behalf of Redbud Energy, LP, in Support of Joint Stipulation and Settlement Agreement, In the Matter of the Application of Oklahoma Gas and Electric Company for an Order of the Commission Granting Pre-Approval of the Purchase of the Redbud Generating Facility and Authorizing a Recovery Rider, Cause No. PUD 200800086, September 3, 2008.

92. Direct Testimony of Judah L. Rose on behalf of Duke Energy Carolinas, In the Matter of Advance Notice by Duke Energy Carolinas, LLC, of its Intent to Grant Native Load Priority to the City of Orangeburg, South Carolina, and Petition of Duke Energy Carolinas, LLC and City of Orangeburg, South Carolina for Declaratory Ruling With Respect to Rate Treatment of Wholesale Sales of Electric Power at Native Load Priority, Docket No. E-7, SUB 858, August 15, 2008.

91. Affidavit filed on behalf of Public Service of New Mexico pertaining to the Fuel Costs of Southwest Public Service for Cost-of-Service and Market-Based Customers, August 11, 2008.

90. Direct Testimony of Judah L. Rose on behalf of Duke Energy Ohio, Inc., Before the Public Utilities Commission of Ohio, In the Matter of the Application of Duke Energy Ohio, Inc. for Approval of an Electric Security Plan, July 31, 2008.

89. Rebuttal Testimony, Judah L. Rose on Behalf of Duke Energy Carolinas, in re: Application of Duke Energy Carolinas, LLC for Approval of Save-A-Watt Approach, Energy Efficiency Rider and Portfolio of Energy Efficiency Programs, Docket No. E-7, Sub 831, July 21, 2008.

88. Updated Analysis of SWEPCO Capacity Expansion Options as Requested by Public Utility Commission of Texas, on behalf of SWEPCO, June 27, 2008.

87. Direct Testimony of Judah L. Rose on Behalf of Nevada Power/Sierra Pacific Electric Power Company, Docket No. 1, Public Utilities Commission of Nevada, Application of Nevada Power/Sierra Pacific for Certificate of Convenience and Necessity Authorization for a Gas-Fired Power Plant in Nevada, May 16, 2008.

86. Rebuttal Testimony of Judah L. Rose on Behalf of the Advanced Power, Commonwealth of Massachusetts, Before the Energy Facilities Siting Board, Petition of Brockton Power Company, LLC, EFSB 07-7, D.P.U. 07-58 & 07-59, May 16, 2008.

85. Supplemental Rebuttal Testimony on Commissioner's Issues of Judah L. Rose for Southwestern Electric Power Company, on behalf of Southwestern Electric Power Company, PUC Docket No. 33891, Public Utilities Commission of Texas, May 2008.

84. Supplemental Direct Testimony on Commissioners' Issues of Judah Rose for Southwestern Electric Power Company, for the Application of Southwestern Electric Power Company for Certificate of Convenience and Necessity Authorization for a Coal-

Fired Power Plant in Arkansas, SOAH Docket No. 473-07-1929, PUC Docket No. 33891, Public Utility Commission of Texas, April 22, 2008.

83. Rebuttal Testimony of Judah Rose, In the Matter of the Application of Tucson Electric Power Company for the Establishment of Just and Reasonable Rates and Charges Designed to Realize A Reasonable Rate of Return on the Fair Value of Its Operations Throughout the State of Arizona, Estimation of Market Value of Fleet of Utility Coal Plants, April 1, 2008.

82. Rebuttal Report of Judah Rose, Ohio Power Company and AEP Power Marketing Inc. vs. Tractebel Energy Marketing, Inc. and Tractebel S.A. Case No. 03 CIV 6770, 03 CIV 6731 (S.D.N.Y.), January 28, 2008

81. Proposed New Gas-Fired Plant, on behalf of AEP SWEPCO, 2007

80. Rebuttal Report, Calpine Cash Flows, on behalf of Unsecured Creditor's Committee, November 21, 2007.

79. Expert Report. Calpine Cash Flows, on behalf of Unsecured Creditor's Committee, November 19, 2007.

78. Application of Duke Energy Carolina, LLC for Approval of Energy Efficiency Plan Including an Energy Efficiency Rider and Portfolio of Energy, Docket No. 2007-358-E, Public Service Commission of South Carolina, December 10, 2007.

77. Independent Transmission Cause No. PUD200700298, Application of ITC, Public Service of Oklahoma, December 7, 2007.

76. Verified Petition of Duke Energy Indiana, Inc. Requesting the Indiana Utility Regulatory Commission to Approve an Alternative Regulatory Plan Pursuant to Ind. Code š8-1-2.5-1, et. Seq. for the Offering of Energy Efficiency Conservation, Demand Response, and Demand-Side Management Programs and Associated Rate Treatment Including Incentives Pursuant to a Revised Standard Contract Rider No. 66 in Accordance With Ind. Code šš8-1-2.5-1 et seq. and 8-1-2-42(a); Authority to Defer Program Costs Associated with its Energy Efficiency Portfolio of Programs; Authority to Implement New and Enhanced Energy Efficiency Programs, Including the PowerShare® Program in its Energy Efficiency Portfolio of Programs; and Approval of a Modification of the Fuel Adjustment Cause Earnings and Expense Tests, Indiana Utility Regulatory Commission, Cause No. 43374, October 19, 2007.

75. Rebuttal Testimony, Docket No. U-30192, Application of Entergy Louisiana, LLC For Approval to Repower the Little Gypsy Unit 3 Electric Generating Facility and for Authority to Commence Construction and for Certain Cost Protection and Cost Recovery, October 4, 2007.

74. Direct Testimony of Judah Rose on Behalf of Tucson Electric Power Company, In the matter of the Application of Tucson Electric Power Company for the Establishment of Just and Reasonable Rates and Charges Designed to Realize a Reasonable Rate of Return on the Fair Value of Its Operations Throughout the State of Arizona, Estimation of Market Value of Fleet of Utility Coal Plants, July 2, 2007.

73. Supplemental Testimony on behalf of Southwestern Electric Power Company before the Arkansas Public Service Commission, In the Matter of Application of Southwestern

Electric Power Company for a Certificate of Environmental Compatibility and Public Need for the Construction, Ownership, Operation, and Maintenance of a Coal-Fired Base Load Generating Facility in the Hempstead County, Arkansas, dated June 15, 2007, Docket No. 06-154-U.

72. Rebuttal Testimony, Causes No. PUD 200500516, 200600030, and 20070001 Consolidated, on behalf of Redbud Energy, before the Corporation Commission of the State of Oklahoma, June 2007.

71. Rebuttal Testimony on behalf of Duke Energy Indiana, IGCC Coal Plant CPCN, Cause No. 43114 before the Indiana Utility Regulatory Commission, May 31, 2007.

70. Responsive Testimony, Causes No. PUD 200500516, 200600030, and 200700012 Consolidated, on behalf of Redbud Energy, before the Corporation Commission of the State of Oklahoma, May 2007.

69. Rebuttal Testimony on behalf of Florida Power & Light Company In Re: Florida Power & Light Company's Petition to Determine Need for FPL Glades Power Park Units 1 and 2 Electrical Power Plant, Docket No. 070098-EL, March 30, 2007.

68. Rebuttal Testimony, Electric Utility Power Hedging, on behalf of Duke Energy Indiana, Cause No. 38707-FAC6851, May 2007.

67. Direct Testimony for Southwestern Electric Power Company, Before the Louisiana Public Service Commission, Docket No. U-29702, in re: Application of Southwestern Electric Power Company for the Certification of Contracts for the Purchase of Capacity for 2007, 2008, and 2009 and to Purchase, Operate, Own, and Install Peaking, Intermediate and Base Load Coal-Fired Generating Facilities in Accordance with the Commission's General Order Dated September 20, 1983. Consolidated with Docket No. U-28766 Sub Docket B in re: Application of Southwestern Electric Power Company for Certification of Contracts for the Purchase of Capacity in Accordance with the Commission's 'General Order of September 20, 1983, February 2007.

66. Second Supplemental Testimony on Behalf of Duke Energy Ohio Before the Public Utility Commission of Ohio, Case No. 03-93-EL-ATA, 03-2079, EL-AAM, 03-2081, EL-AAM, 03-2080, EL-ATA, February 28, 2007.

65. Electric Utility Power Hedging, on behalf of Duke Energy Indiana, Cause No. 38707-FAC6851, February 2007.

64. Supplemental Testimony on behalf of Duke Energy Carolinas before the North Carolina Utilities Commission in the Matter of Application of Duke Energy Carolinas, LLC for Approval for an Electric Generation Certificate of Public Convenience and Necessity to Construct Two 800 MW State of Art Coal Units for Cliffside Project, Docket No. E7, SUB790, December 2006.

63. Expert Report, Chapter 11, Case No. 01-16034 (AJG) and Adv. Proc. No. 04-2933 (AJG), November 6, 2006.

62. IGCC Coal Plant, Testimony on behalf of Duke Energy Indiana, Cause No. 43114, October 2006.

61. Market Power and the PSEG Exelon Merger on Behalf of the NJBPU Staff, NJBPU, BPU Docket No. EM05020106 OAL Docket No. PUC-1874-05, Supplemental Testimony March 20, 2006.

60. Market Power and the PSEG Exelon Merger on Behalf of the NJBPU Staff, NJBPU, BPU Docket No. EM05020106, OAL Docket No. PUC-1874-05, Surrebuttal Testimony December 27, 2005.

59. Market Power and the PSEG Exelon Merger on Behalf of the NJBPU Staff, NJBPU, BPU Docket No. EM05020106, OAL Docket No. PUC-1874-05, November 14, 2005.

58. Brazilian Power Purchase Agreement, confidential international arbitration, October 2005.

57. Cost of Service and Fuel Clause Issues, Rebuttal Testimony on behalf of Public Service of New Mexico, Docket No. EL05-151, November 2005.

56. Cost of Service and Peak Demand, FERC, Testimony on behalf of Public Service of New Mexico, September 19, 2005, Docket No. EL05-19.

55. Cost of Service and Fuel Clause Issues, Testimony on behalf of Public Service of New Mexico, FERC Docket No. EL05-151-000, September 15, 2005.

54. Cost of Service and Peak Demand, FERC, Responsive Testimony on behalf of Public Service of New Mexico, August 23, 2005, Docket No. EL05-19.

53. Prudence of Acquisition of Power Plant, Testimony on behalf of Redbud, September 12, 2005, No. PUD 200500151.

52. Proposed Fuel Cost Adjustment Clause, FERC, Docket Nos. EL05-19-002 and ER05-168-001 (Consolidated), August 22, 2005.

51. Market Power and the PSEG Exelon Merger on Behalf of the NJBPU, FERC, Docket EC05-43-000, May 27, 2005.

50. New Air Emission Regulations and Investment in Coal Power Plants, rebuttal testimony on behalf of PSI, April 18, 2005, Causes 42622 and 42718.

49. Rebuttal Report: Damages due to Rejection of Tolling Agreement Including Discounting, February 9, 2005, CONFIDENTIAL.

48. New Air Emission Regulations and Investment in Coal Power Plants, supplemental testimony on behalf of PSI, January 21, 2005, Causes 42622 and 42718.

47. Damages Due to Rejection of Tolling Agreement Including Discounting, January 10, 2005, CONFIDENTIAL.

46. Discount rates that should be used in estimating the damages to GTN of Mirant's bankruptcy and subsequent abrogation of the gas transportation agreements Mirant had entered into with GTN, December 15, 2004. CONFIDENTIAL

45. New Air Emission Regulations and Investment in Coal Power Plants, testimony on behalf of PSI, November 2004, Causes 42622 and 42718.

44. Rebuttal Testimony of Judah Rose on behalf of PSI, "Certificate of Purchase as of yet Undetermined Generation Facility" Cause No. 42469, August 23, 2004.

43. Rebuttal Testimony of Judah Rose on behalf of the Hopi Tribe, Case No. A.02-05-046, Mohave Coal Plant Economics, June 4, 2004.

42. Supplemental Testimony "Retail Generation Rates, Cost Recovery Associated with the Midwest Independent Transmission System Operator, Accounting Procedures for Transmission and Distribution System, Case No. 03-93-EL-ATA, 03-2079, EL-AAM, 03-2081, EL-AAM, 03-2080, EL-ATA for Cincinnati Gas & Electric, May 20, 2004.

41. "Application of Southern California Edison Company (U338-E) Regarding the Future Disposition of the Mohave Coal-Fired Generating Station," May 14, 2004.

40. "Appropriate Rate of Return on Equity (ROE) TransAlta Should be Authorized For its Capital Investment Related to VAR Support From the Centralia Coal-Fired Power Plant", for TransAlta, April 30, 2004, FERC Docket No. ER04-810-000.

39. "Retail Generation Rates, Cost Recovery Associated with the Midwest Independent Transmission System Operator, Accounting Procedures for Transmission and Distribution System, Case No. 03-93-EL-ATA, 03-2079, EL-AAM, 03-2081, EL-AAM, 03-2080, EL-ATA for Cincinnati Gas & Electric, April 15, 2004.

38. "Valuation of Selected MIRMA Coal Plants, Acceptance and Rejection of Leases and Potential Prejudice to Leasors" Federal Bankruptcy Court, Dallas, TX, March 24, 2004 CONFIDENTIAL.

37. "Certificate of Purchase as of yet Undetermined Generation Facility", Cause No. 42469 for PSI, March 23, 2004.

36. "Ohio Edison's Sammis Power Plant BACT Remedy Case", In the United States District Court of Ohio, Southern Division, March 8, 2004.

35. "Valuation of Power Contract," January 2004, confidential arbitration.

34. "In the matter of the Application of the Union Light Heat & Power Company for a Certificate of Public Convenience and Necessity to Acquire Certain Generation Resources, etc.", before the Kentucky Public Service Commission, Coal-Fired and Gas-Fired Market Values, July 21, 2003.

33. "In the Supreme Court of British Columbia", July 8, 2003. CONFIDENTIAL

32. "The Future of the Mohave Coal-Fired Power Plant – Rebuttal Testimony", California P.U.C., May 20, 2003.

31. "Affidavit in Support of the Debtors' Motion", NRG Bankruptcy, Revenues of a Fleet of Plants, May 14, 2003. CONFIDENTIAL

30. "IPP Power Purchase Agreement," confidential arbitration, April 2003.

29. "The Future of the Mohave Coal-Fired Power Plant", California P.U.C., March 2003.

28. "Power Supply in the Pacific Northwest," contract arbitration, December 5, 2002. CONFIDENTIAL

27. "Power Purchase Agreement Valuation", Confidential Arbitration, October 2002.

26. "Cause No. 42145 - In support of PSI's petition for authority to acquire the Madison and Henry County plants, rebuttal testimony on behalf of PSI. Filed on 8/23/02."

25. "Cause No. 42200 - in support of PSI's petition for authority to recover through retail rates on a timely basis. Filed on 7/30/02."

24. "Cause No. 42196 - in support of PSI's petition for interim purchased power contract. Filed on 4/26/02."

23. "Cause No. 42145 - In support of PSI's petition for authority to acquire the Madison and Henry County plants. Filed on 3/1/2002."

22. "Analysis of an IGCC Coal Power Plant", Minnesota state senate committees, January 22, 2002

21. "Analysis of an IGCC Coal Power Plant", Minnesota state house of representative committees, January 15, 2002

20. "Interim Pricing Report on New York State's Independent System Operator", New York State Public Service Commission (NYSPSC), January 5, 2001

19. "The need for new capacity in Indiana and the IRP process", Indiana Utility Regulatory Commission, October 26, 2000

18. "Damage estimates for power curtailment for a Cogen power plant in Nevada", August 2000. CONFIDENTIAL

17. "Valuation of a power plant in Arizona", arbitration, July 2000. CONFIDENTIAL

16. Application of FirstEnergy Corporation for approval of an electric Transition Plan and for authorization to recover transition revenues, Stranded Cost and Market Value of a Fleet of Coal, Nuclear, and Other Plants, Before PUCO, Case No. 99-1212-EL-ETP, October 4, 1999 and April 2000.

15. "Issues Related to Acquisition of an Oil/Gas Steam Power plant in New York", September 1999 Affidavit to Hennepin County District Court, Minnesota

14. "Wholesale Power Prices, A Cost Plus All Requirements Contract and Damages", Cajun Bankruptcy, July 1999. Testimony to U.S. Bankruptcy Court.

13. "Power Prices." Testimony in confidential contract arbitration, July 1998.

12. "Horizontal Market Power in Generation." Testimony to New Jersey Board of Public Utilities, May 22, 1998.

11. "Basic Generation Services and Determining Market Prices." Testimony to the New Jersey Board of Public Utilities, May 12, 1998.

10. "Generation Reliability." Testimony to New Jersey Board of Public Utilities, May 4, 1998.

9. "Future Rate Paths and Financial Feasibility of Project Financing." Cajun Bankruptcy, Testimony to U.S. Bankruptcy Court, April 1998.

8. "Stranded Costs of PSE&G." Market Valuation of a Fleet of Coal, Nuclear, Gas, and Oil-Fired Power Plants, Testimony to New Jersey Board of Public Utilities, February 1998.

7. "Application of PECO Energy Company for Approval of its Restructuring Plan Under Section 2806 of the Public Utility Code." Market Value of Fleet of Nuclear, Coal, Gas, and Oil Power Plants, Rebuttal Testimony filed July 1997.

6. "Future Wholesale Electricity Prices, Fuel Markets, Coal Transportation and the Cajun Bankruptcy." Testimony to Louisiana Public Service Commission, December 1996.

5. "Curtailment of the Saguaro QF, Power Contracting and Southwest Power Markets." Testimony on a contract arbitration, Las Vegas, Nevada, June 1996.

4. "Future Rate Paths and the Cajun Bankruptcy." Testimony to the U.S. Bankruptcy Court, June 1997.

3. "Fuel Prices and Coal Transportation." Testimony to the U.S. Bankruptcy Court, June 1997.

2. "Demand for Gas Pipeline Capacity in Florida from Electric Utilities." Testimony to Florida Public Service Commission, May 1993.

1. "The Case for Fuel Flexibility in the Florida Electric Generation Industry." Testimony to the Florida Department of Environmental Regulation (DER), Hearings on Fuel Diversity and Environmental Protection, December 1992.

SELECTED SPEAKING ENGAGEMENTS

99. Rose, J.L., Vinson & Elkins Conference, Houston, TX, November 11, 2010.

98. Rose, J.L., Fundamentals of Electricity Transmission, EUCI, Crystal City, Arlington, VA, June 29-30, 2010.

97. Rose, J.L., Economics of PC Refurbishment, Improving the Efficiency of Coal-Fired Power Generation in the U.S., DOE-NETL, February 24, 2010.

96. Rose, J.L., Fundamentals of Electricity Transmission, EUCI, Orlando, FL, January 25-26, 2010.

95. Rose, J.L., CO_2 Control, "Cap & Trade", & Selected Energy Issues, Multi-Housing Laundry Association, October 26, 2009.

94. Rose, J.L., Financing for the Future – Can We Afford It?, 2009 Bonbright Conference, October 9, 2009.

93. Rose, J.L., EEI's Transmission and Market Design School, Washington, D.C., June 2009.

92. Rose, J.L., ICF's New York City Energy Forum - Market Recovery in Merchant Generation Assets, June 10, 2008.

91. Rose, J.L., Southeastern Electric Exchange – Integrated Resource Planning Task Force Meeting, Carbon Tax Outlook Discussion, February 21-22, 2008.

90. Rose, J.L., AESP, NEEC Conference, Rising Prices and Failing Infrastructure: A Bleak or Optimistic Future, Marlborough, MA, October 23, 2006.

89. Rose, J.L., Infocast Gas Storage Conference, "Estimating the Growth Potential for Gas-Fired Electric Generation," Houston, TX, March 22, 2006.

88. Rose, J.L., "Power Market Trends Impacting the Value of Power Assets," Infocast Conference, Powering Up for a New Era of Power Generation M&A, February 23, 2006.

87. Rose, J.L., "The Challenge Posed by Rising Fuel and Power Costs", Lehman Brothers, November 2, 2005.

86. Rose, J.L., "Modeling the Vulnerability of the Power Sector", EUCI – Securing the Nation's Energy Infrastructure, September 19, 2005

85. Rose, J.L., "Fuel Diversity in the Northeast, Energy Bar Association, Northeast Chapter Meeting, New York, NY, June 9, 2005.

84. Rose, J.L., "2005 Macquarie Utility Sector Conference", Macquarie Utility Sector Conference, Vail, CO, February 28, 2005.

83. Rose, J.L., "The Outlook for North American Natural Gas and Power Markets", The Institute for Energy Law, Program on Oil and Gas Law, Houston, TX, February 18, 2005.

82. Rose, J.L. "Assessing the Salability of Merchant Assets – What's on the Horizon?" Infocast – The Market for Power Assets, Phoenix, AZ, February 10, 2005.

81. Rose, J.L. "Market Based Approaches to Transmission – Longer-Term Role", National Group of Municipal Bond Investors, New York, NY, December 10, 2004.

80. Rose, J.L. "Supply & Demand Fundamentals – What is Short-Term Outlook and the Long-Term Demand? Platt's Power Marketing Conference, Houston, TX, October 11, 2004.

79. Rose, J.L. "Assessing the Salability of Merchant Assets – When Will We Hit Bottom?, Infocast's Buying, Selling, and Investing in Energy Assets Conference, Houston, TX, June 24, 2004.

78. Rose, J. L. "After the Blackout – Questions That Every Regulator Should be Asking," NARUC Webinar Conference, Fairfax, VA, November 6, 2003.

77. Rose, J. L., "Supply and Demand in U.S. Wholesale Power Markets," Lehman Brothers Global Credit Conference, New York, NY, November 5, 2003.

76. Rose, J.L., "Assessing the Salability of Merchant Assets – When Will We Hit Bottom?", Infocast's Opportunities in Energy Asset Acquisition, San Francisco, CA, October 9, 2003.

75. Rose, J.L., "Asset Valuation in Today's Market", Infocast's Project Finance Tutorial, New York, NY, October 8, 2003.

74. Rose, J.L., "Forensic Evaluation of Problem Projects", Infocast's Project Finance Workouts: Dealing With Distressed Energy Projects, September 17, 2003.

73. Rose, J.L., National Management Emergency Association, Seattle, WA, September 8, 2003.

72. Rose, J.L., "Assessing the Salability of Merchant Assets – When Will We Hit Bottom?", Infocast's Buying, Selling & Investing in Energy Assets, Chicago, IL, July 24, 2003.

71. Rose, J.L., CSFB Leveraged Finance Independent Power Producers and Utilities Conference, New York, NY, "Spark Spread Outlook", July 17, 2003.

70. Rose, J.L., Multi-Housing Laundry Association, Washington, D. C., "Trends in U.S. Energy and Economy", June 24, 2003.

69. Rose, J.L., "Power Markets: Prices, SMD, Transmission Access, and Trading", Bechtel Management Seminar, Frederick, MD, June 10, 2003.

68. Rose, J.L., Platt's Global Power Market Conference, New Orleans, LA, "The Outlook for Recovery," March 31, 2003.

67. Rose, J.L., "Electricity Transmission and Grid Security", Energy Security Conference, Crystal City, VA, March 25, 2003.

66. Rose, J.L., "Assessing the Salability of Merchant Assets – When Will We Hit Bottom?, Infocast's Buying, Selling & Investing in Energy Assets, New York City, February 27, 2003.

65. Rose, J.L., Panel Discussion, "Forensic Evaluation of Problem Projects", Infocast Conference, NY, February 24, 2003.

64. Rose, J.L., PSEG Off-Site Meeting Panel Discussion, February 6, 2003 (April 13, 2003).

63. Rose, J.L., "The Merchant Power Market—Where Do We Go From Here?" Center for Business Intelligence's Financing U.S. Power Projects, November 18-19, 2002.

62. Rose, J.L., "Assessing U.S. Regional And The Potential for Additional Coal-Fired Generation in Each Region," Infocast's Building New Coal-Fired Generation Conference, October 8, 2002.

61. Rose, J.L., "Predicting the Price of Power for Asset Valuation in the Merchant Power Financings, "Infocast's Product Structuring in the Real World Conference, September 25, 2002.

60. Rose, J.L., "PJM Price Outlook," Platt's Annual PJM Regional Conference, September 24, 2002.

59. Rose, J.L., "Why Investors Are Zeroing in on Upgrading Our Antiquated Power Grid Rather Than Exotic & Complicated Technologies," New York Venture Group's Investing in the Power Industry—Targeting The Newest Trends Conference, July 31, 2002.

58. Rose, J.L., Panel Participant in the Salomon Smith Barney Power and Energy Merchant Conference 2002, May 15, 2002.

57. Rose, J.L., "Locational Market Price (LMP) Forecasting in Plant Financing Decisions," Structured Finance Institute, April 8-9, 2002.

56. Rose, J.L., "PJM Transmission and Generation Forecast", Financial Times Energy Conference, November 6, 2001.

55. Rose, J.L., "U.S. Power Sector Trends", Credit Suisse First Boston's Power Generation Supply Chain Conference, Web Presented Conference, September 12, 2002.

54. Rose, J.L., "Dealing with Inter-Regional Power Transmission Issues", Infocast's Ohio Power Game Conference, September 6, 2001

53. Rose, J.L., "Where's the Next California", Credit Suisse First Boston's Global Project Finance Capital Markets Conference, New York NY, June 27 2001

52. Rose, J.L, "U.S. Energy Issues: What MLA Members Need to Know," Multi-housing Laundry Association, Boca Raton Florida, June 25, 2001

51. Rose, J.L., "How the California Meltdown Affects Power Development", Infocast's Power Development and Finance Conference 2001, Washington D.C., June 12, 2001

50. Rose, J.L., "Forecasting 2001 Electricity Prices" presentation and workshop, What to Expect in western Power Markets this Summer 2001 Conference, Denver, Colorado, May 2, 2001

49. Rose, J.L., "Power Crisis in the West" Generation Panel Presentation, San Diego, California, February 12, 2001

48. Rose, J.L., "An Analysis of the Causes leading to the Summer Price Spikes of 1999 & 2000" Conference Chair, Infocast Managing Summer Price Volatility, Houston, Texas, January 30, 2001.

47. Rose, J. L., "An Analysis of the Power Markets, summer 2000" Generation Panel Presentation, Financial Times Power Mart 2000 conference, Houston, Texas, October 18, 2000

46. Rose, J.L., "An Analysis of the Merchant Power Market, Summer 2000" presentation, Conference Chair, Merchant Power Finance Conference, Atlanta, Georgia, September 11 to 15, 2000

45. Rose, J.L., "Understanding Capacity Value and Pricing Firmness" presentation, Conference Chair, Merchant Plant Development and Finance Conference, Houston, Texas, March 30, 2000.

44. Rose, J.L., "Implementing NYPP's Congestion Pricing and Transmission Congestion Contract (TCC)", Infocast Congestion Pricing and Forecasting Conference, Washington D.C., November 19, 1999.

43. Rose, J.L., "Understanding Generation" Pre-Conference Workshop, Powermart, Houston, Texas, October 26-28, 1999.

42. Rose, J.L., "Understanding Capacity Value and Pricing Firmness" presentation, Conference Chair Merchant Plant Development and Finance Conference, Houston, Texas, September 29, 1999.

41. Rose, J.L., "Comparative Market Outlook for Merchant Assets" presentation, Merchant Power Conference, New York, New York, September 24, 1999.

40. Rose, J.L., "Transmission, Congestion, and Capacity Pricing" presentation, Transmission The Future of Electric Transmission Conference, Washington, DC, September 13, 1999.

39. Rose, J.L., "Effects of Market Power on Power Prices in Competitive Energy Markets" Keynote Address, The Impact of Market Power in Competitive Energy Markets Conference, Washington, DC, July 14, 1999.

38. Rose, J.L., "Peak Price Volatility in ECAR and the Midwest, Futures Contracts: Liquidity, Arbitrage Opportunity" presentation at ECAR Power Markets Conference, Columbus, Ohio, June 9, 1999.

37. Rose, J.L., "Transmission Solutions to Market Power" presentation, Do Companies in the Energy Industry Have Too Much Market Power? Conference, Washington, DC, May 24, 1999.

36. Rose, J.L., "Repowering Existing Power Plants and Its Impact on Market Prices" presentation, Exploiting the Full Energy Value-Chain Conference, Chicago, Illinois, May 17, 1999.

35. Rose, J.L., "Transmission and Retail Issues in the Electric Industry" Session Speaker, Gas Mart/Power 99 Conference, Dallas, Texas, May 10, 1999.

34. Rose, J.L., "Peak Price Volatility in the Rockies and Southwest" presentation at Repowering the Rockies and the Southwest Conference, Denver, Colorado, May 5, 1999.

33. Rose, J.L., "Understanding Generation" presentation and Program Chairman at Buying & Selling Power Assets: The Great Generation Sell-Off Conference, Houston, Texas, April 20, 1999.

32. Rose, J.L., "Buying Generation Assets in PJM" presentation at Mid-Atlantic Power Summit, Philadelphia, Pennsylvania, April 12, 1999.

31. Rose, J.L., "Evaluating Your Generation Options in Situations With Insufficient Transmission," presentation at Congestion Management conference, Washington, D.C., March 25, 1999.

30. Rose, J.L., "Will Capacity Prices Drive Future Power Prices?" presentation at Merchant Plant Development conference, Chicago, Illinois, March 23, 1999.

29. Rose, J.L., "Capacity Value – Pricing Firmness," presentation at Market Price Forecasting conference, Atlanta, Georgia, February 25, 1999

28. Rose, J.L., "Developing Reasonable Expectations About Financing New Merchant Plants That Have Less Competitive Advantage Than Current Projects," presentation at Project Finance International's Financing Power Projects in the USA conference, New York, New York, February 11, 1999.

27. Rose, J.L., "Transmission and Capacity Pricing and Constraints," presentation at Power Fair 99, Houston, Texas, February 4, 1999.

26. Rose, J.L., "Peak Price Volatility: Comparing ERCOT With Other Regions," presentation at Megawatt Daily's Trading Power in ERCOT conference, Houston, Texas, January 13, 1999.

25. Rose, J.L., "The Outlook for Midwest Power Markets," presentation to The Institute for Regulatory Policy Studies at Illinois State University, Springfield, Illinois, November 19, 1998.

24. Rose, J.L., "Developing Pricing Strategies for Generation Assets," presentation at Wholesale Power in the West conference, Las Vegas, Nevada, November 12, 1998.

23. Rose, J.L., "Understanding Electricity Generation and Deregulated Wholesale Power Prices," a full-day pre-conference workshop at Power Mart 98, Houston, Texas, October 26, 1998.

22. Rose, J.L., "The Impact of Power Generation Upgrades, Merchant Plant Developments, New Transmission Projects and Upgrades on Power Prices," presentation at Profiting in the New York Power Market conference, New York, NY, October 22, 1998.

21. Rose, J.L., "Capacity Value – Pricing Firmness," presentation to Edison Electric Institute Economics Committee, Charlotte, NC, October 8, 1998.

20. Rose, J.L., "Locational Marginal Pricing and Futures Trading," presentation at Megawatt Daily's Electricity Regulation conference, Washington, D.C., October 7, 1998.

19. Rose, J.L., Chairman's opening speech and "The Move Toward a Decentralized Approach: How Will Nodal Pricing Impact Power Markets?" at Congestion Pricing and Tariffs conference, Washington, D.C., September 25, 1998.

18. Rose, J.L., "The Generation Market in MAPP/MAIN: An Overview," presentation at Megawatt Daily's MAIN/MAPP – The New Dynamics conference, Minneapolis, Minnesota, September 16, 1998.

17. Rose, J.L., "Capacity Value – Pricing Firmness," presentation at Market Price Forecasting conference, Baltimore, Maryland, August 24, 1998.

16. Rose, J.L., "ICF Kaiser's Wholesale Power Market Model," presentation at Market Price Forecasting conference, New York, New York, August 6, 1998.

15. Rose, J.L., Campbell, R., Kathan, David, "Valuing Assets and Companies in M&A Transactions," full-day workshop at Utility Mergers & Acquisitions conference, Washington, D.C., July 15, 1998.

14. Rose, J.L., "Must-Run Nuclear Generation's Impact on Price Forecasting and Operations," presentation at The Energy Institute's conference entitled "Buying and Selling Electricity in the Wholesale Power Market," Las Vegas, Nevada, June 25, 1998.

13. Rose, J.L., "The Generation Market in PJM," presentation at Megawatt Daily's PJM Power Markets conference, Philadelphia, Pennsylvania, June 17, 1998.

12. Rose, J.L., "Market Evaluation of Electric Generating Assets in the Northeast," presentation at McGraw-Hill's conference: Electric Asset Sales in the Northeast, Boston, Massachusetts, June 15, 1998.

11. Rose, J.L., "Overview of SERC Power," opening speech presented at Megawatt Daily's SERC Power Markets conference, Atlanta, Georgia, May 20, 1998.

10. Rose, J.L., "Future Price Forecasting," presentation at The Southeast Energy Buyers Summit, Atlanta, Georgia, May 7, 1998.

9. Rose, J.L., "Practical Risk Management in the Power Industry," presentation at Power Fair, Toronto, Canada, April 16, 1998.

8. Rose, J.L., "The Wholesale Power Market in ERCOT: Transmission Issues," presentation at Megawatt Daily's ERCOT Power Markets conference, Houston, Texas, April 1, 1998.

7. Rose, J.L., "New Generation Projects and Merchant Capacity Coming On-Line," presentation at Northeast Wholesale Power Market conference, New York, New York, March 18, 1998.

6. Rose, J.L., "Projecting Market Prices in a Deregulated Electricity Market," presentation at conference: Market Price Forecasting, San Francisco, California, March 9, 1998.

5. Rose, J.L., "Handling of Transmission Rights," presentation at conference: Congestion Pricing & Tariffs, Washington, D.C., January 23, 1998.

4. Rose, J.L., "Understanding Wholesale Markets and Power Marketing," presentation at The Power Marketing Association Annual Meeting, Washington, D.C., November 11, 1997.

2. Rose, J.L., "Determining the Electricity Forward Curve," presentation at seminar: Pricing, Hedging, Trading, and Risk Management of Electricity Derivatives, New York, New York, October 23, 1997.

3. Rose, J.L., "Market Price Forecasting In A Deregulated Market," presentation at conference: Market Price Forecasting, Washington, D.C., October 23, 1997,

1. Rose, J.L., "Credit Risk Versus Commodity Risk," presentation at conference: Developing & Financing Merchant Power Plants in the New U.S. Market, New York, New York, September 16, 1997.

SELECTED PUBLICATIONS

Rose, J.L. and Surana, S. "Using Yield Curves and Energy Prices to Forecast Recessions – An Update." World Generation, March/April 2011, V.23 #2.

Rose, J.L. and Surana, S. "Oil Price Increases, Yield Curve Inversion may be Indicators of Economic Recession." Oil and Gas Financial Journal, Volume 7, Issue 6, June 2010

Rose, J.L. and Surana, S. "Forecasting Recessions and Investment Strategies." World-Generation, June/July 2010, V.22, #3.

Rose, J.L., "Should Environmental Restrictions be Eased to Allow for the Construction of More Power Plants? The Costco Connection, April 2001.

Rose, J.L., "Deregulation in the US Generation Sector: A Mid-Course Appraisal", Power Economics, October 2000.

Rose, J. L., "Price Spike Reality: Debunking the Myth of Failed Markets", *Public Utilities Fortnightly,* November 1, 2000.

Rose, J.L., "Missed Opportunity: What's Right and Wrong in the FERC Staff Report on the Midwest Price Spikes," *Public Utilities Fortnightly,* November 15, 1998.

Rose, J.L., "Why the June Price Spike Was Not a Fluke," *The Electricity Journal*, November 1998.

Rose, J.L., S. Muthiah, and J. Spencer, "Will Wall Street Rescue the Competitive Wholesale Power Market?" *Project Finance International*, May 1998.

Rose, J.L., "Last Summer's "Pure" Capacity Prices – A Harbinger of Things to Come," *Public Utilities Fortnightly,* December 1, 1997.

Rose, J.L., D. Kathan, and J. Spencer "Electricity Deregulation in the New England States," *Energy Buyer*, Volume 1, Issue 10, June-July 1997.

Rose, J.L., S. Muthiah, and M. Fusco, "Financial Engineering in the Power Sector," *The Electricity Journal,* Jan/Feb 1997.

Rose, J.L, S. Muthiah, and M. Fusco, "Is Competition Lacking in Generation? (And Why it Should Not Matter)," *Public Utilities Fortnightly,* January 1, 1997.

Mann, C. and J.L. Rose, "Price Risk Management: Electric Power vs. Natural Gas," *Public Utilities Fortnightly,* February 1996.

Rose, J.L. and C. Mann, "Unbundling the Electric Capacity Price in a Deregulated Commodity Market," *Public Utilities Fortnightly,* December 1995.

Booth, William and J.L. Rose, "FERC's Hourly System Lambda Data as Interim Bulk Power Price Information," *Public Utilities Fortnightly,* May 1, 1995.

Rose, J.L. and M. Frevert, "Natural Gas: The Power Generation Fuel for the 1990s." Published by Enron.

EMPLOYMENT HISTORY

ICF Resources Incorporated	Managing Director	1999-Present
	Vice President	1996-1999
	Project Manager	1993-1996
	Senior Associate	1986-1993
	Associate	1982-1986

TAB 16
Allen William Scarfone, P.E.

Allen William Scarfone, P.E.
184 Lincoln Drive
Glastonbury, Connecticut 06033

SUMMARY:

- Professional engineer for 29 years in the electric utility industry including 26 years of transmission planning experience for Northeast Utilities.
- Manager of the Northeast Utilities' Transmission Planning Department.
- Northeast Utilities' representative on the NEPOOL Reliability Committee and on various ISO-NE Regional Transmission Planning Working Groups.

EXPERIENCE:

NORTHEAST UTILITIES — Berlin, Connecticut
Transmission Planning Department - Manager — 1992 - Present

- Performs 345-kV and 115-kV transmission planning studies for Northeast Utilities' Operating Subsidiaries; Connecticut Light & Power Company, Public Service Company of New Hampshire and Western Massachusetts Electric Company.
- Develops transmission line and substation equipment reinforcement plans to comply with the North American Reliability Corporation's mandatory transmission planning standards.
- Performs and coordinates system impact studies for merchant generating plants connected to the 345-kV and 115-kV transmission systems and transmission service wheeling transactions under regional transmission tariffs.
- Develops periodic regulatory filings for agencies in Connecticut, New Hampshire, and Massachusetts and for the Federal Energy Regulatory Commission.
- Company witness before the New Hampshire Public Utilities Commission, Connecticut Department of Public Utility Control, Connecticut Siting Council, Massachusetts Department of Public Utilities, Massachusetts Energy Facilities Siting Board and the Federal Energy Regulatory Commission.

Northeast Utilities' member on the NEPOOL Reliability Committee:

- Coordinates Northeast Utilities' transmission plans with regional transmission planning studies.
- Participates in reviews of regional transmission plans and regional cost allocation applications.
- Participates in reviews of regional market reliability assessments and compliance requirements.
- Participates in developing rules and procedures to implement regional transmission planning services.

Northeast Utilities' previous member on the NEPOOL Transmission Committee:

- Participated in developing rules and procedures to implement regional transmission services under the ISO-NE Transmission, Markets and Services Tariff.

Northeast Utilities' previous coordinator of open access transmission services:

- Implements FERC's open access transmission service requirements.
- Administers transmission service agreements, transmission contracts and OASIS.
- Coordinates strategic transmission initiatives before ISO-NE and FERC.

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE — Manchester, New Hampshire
Transmission Planning Department — 1986 - 1992

- Performed 345-kV and 115-kV transmission planning and budgeting studies.
- Determined economic feasibility and cost-effectiveness of alternative transmission plans.
- Coordinated load distribution reports and distribution facility impacts on transmission plans.
- Determined 345-kV and 115-kV transmission line equipment thermal capabilities.

- Performed system impact studies for utility-owned and merchant generating plants.
- Developed generator reactive power capability limits and voltage control schedules, from transient and steady-state stability studies, for generators connected to the 345-kV and 115-kV transmission systems.

UNITED ENGINEERS & CONSTRUCTORS, INC. Seabrook, New Hampshire
Seabrook Station Nuclear Project 1982 – 1986

- Designed electrical control schemes for electrical, mechanical and HVAC plant systems.
- Developed installation procedures for electrical equipment and cables.
- Evaluated manufactures electrical equipment design changes.
- Coordinated engineering technical support activities with on-site construction and start-up departments.

PROFESSIONAL:

Registered Professional Engineer: New Hampshire Certificate Number 6909
Member, Institute of Electrical and Electronics Engineers (IEEE)

EDUCATION:

Purdue University, West Lafayette, Indiana
B.S.E.E., 1982 Power Engineering Major

Bechtel Power Corporation, Ann Arbor, Michigan
Cooperative Engineering Program, 1979 – 1981

Power Technologies Incorporated, Schenectady, New York
Advanced Transmission Planning with Modern Network Analysis Tools, April 2000
Electric Power Systems Engineering, 1988 – 1990
Power System Planning Techniques Course, September 1986

Public Utilities Reports, Inc., Arlington, Virginia
Principles of Public Utilities Operations and Management, February 1994

EPRI and Powertech Labs Inc., Palo Alto, California and Surrey, British Columbia
Power System Analysis Course, November 1994

International Business Communications, Southborough, Massachusetts
Pricing Strategies for Power Generation, Transmission & Ancillary Services, December 1995

COMMITTEES:

Current:
NEPOOL Reliability Committee, ISO-NE Southern New England Working Group.

Recent:
NEPOOL Transmission Committee, ISO-NE/Transmission Owners Working Group, ISO-NE Southwest Connecticut Working Group, NEPOOL Open Access Transmission Service Tariff Schedule 2 Working Group, NEPOOL Transmission Service Pricing Task Force, Northeast Power Coordinating Council SS-36 Task Force, NEPOOL Transmission Task Force.

PUBLICATIONS:

Co-authored, "Dynamic Performance Studies for a $\pm$ 150 MVAr STATCOM for Northeast Utilities", Presented to IEEE, 2003.

"Short-Circuit Simulations Help Quantify Wheeling Flow", IEEE Computer Applications in Power, Volume 8, Number 2, April 1995.

TAB 17
Maria Fusco Scheller

MARIA FUSCO SCHELLER

VICE PRESIDENT

ICF INTERNATIONAL

EDUCATION

Successfully completed all coursework in Masters Program, Virginia Polytechnical University, Department of Economics (degree pending thesis)

B.S., Economics with honors, The Pennsylvania State University, University Scholars Program, 1992

EXPERIENCE OVERVIEW

Ms. Scheller joined ICF Resources in 1994 as an Analyst and is currently serving as a Vice President of the company and Director in the Wholesale Power Market Practice.

Ms. Scheller provides analytical services related to aspects of the wholesale power markets including regulatory support, asset valuation, due diligence, litigation, and strategic studies. This work involves review and creation of economic and technical aspects of power supply including: avoided energy supply cost determination; forward price curve analysis; plant dispatch analysis; power sector restructuring; regulatory protocol analysis; power plant siting, evaluation of power purchase and tolling agreements; revenue forecasts and financial performance of assets in competitive and deregulating markets; expansion planning for generation companies; environmental compliance; financial impact of regulatory programs, and transmission flow and congestion analysis. Ms. Scheller also manages the development of model and software for products used to assess the power markets. While at ICF, Ms. Scheller has achieved a high degree of accomplishments and responsibilities. Ms. Scheller's focus has been broad, covering a range of economic and technology assignments. Her experience includes:

- Managing studies on the wholesale power marketplaces including valuation of generating assets, power marketing, due diligence, short-term volatility analysis, strategic positioning, and fuel market analysis.
    - Leading due diligence financial review for multiple power plant and portfolio transactions
    - Valuing power plant and transmission assets
    - Assessing risk for generation providers
    - Evaluating financial impact of energy efficiency programs in the electricity market
    - Analyzing power purchase agreement contract structure
    - Analyzing coal mining and transportation issues, gas market pricing issues, and oil and by-product pricing.
- Managing regulatory and litigation support projects
    - Creating regulated cost of service filing
    - Evaluating alternative structure for fuel adjustment clauses to stakeholders
    - Review of alternate demand allocation approaches under utility cost of service approaches
    - Providing support for contract disputes including power and fuel purchase agreements
    - Supporting Integrated Resource Planning
    - Evaluating Utility proposals filings for transmission and distribution upgrades to state regulatory agencies

    - Performing a detailed review of the industry financial status in the US marketplace related to implementation of mandatory national emissions reduction programs
- Directing product design and development for the Integrated Planning Model (IPM®) and other analysis tools for the electrical power markets
    - Under her guidance, this model has developed from a tool used almost exclusively for public sector environmental compliance analysis into a complete and robust tool capable of analyzing all power market aspects including power pricing. The tool is now used in all public and private sector wholesale price analysis and environmental cost and compliance analysis performed by the ICF Energy Group.
    - Ms. Scheller also managed the developed the Wholesale Power Market Model (WPMM™), a commercial tool for forecasting hourly zonal power market prices, and she has conducted both on- and off-site training sessions for model users.

RELEVANT EXPERIENCE

Wholesale Power Market Analysis: Ms. Scheller has performed analyses of many projects for utility and the non-utility power generation sector clients. Her work has involved dispatch assessment, energy price, capacity price and revenue forecasting. Scenario analyses, including probabilistic assessments, were performed as part of these assignments. Ms. Scheller has analyzed the US power markets wholesale and ancillary service markets often.

Regulatory Proceedings: Ms. Scheller prepared or assisted in the preparation of testimony or presentation material for several state and federal proceedings. Topics of such testimony include siting of power plant and transmission facilities; utility cost of service proceedings; tariff rates; natural gas deliverability; and fuel adjustment clauses.

Asset and Portfolio Valuation: Ms. Scheller has managed several projects focusing on the valuation of generating assets including cogeneration, steam (coal / oil-gas), turbine based, hydro, gasification, and renewables, in various marketplaces. She has also managed portfolio valuation projects. These analyses include research into the various marketplaces to gain knowledge of current market conditions and the potential for change in the market conditions. Probabilistic forecast assessments were conducted to derive expected marketplace prices for energy and capacity prices. Unit performance was then analyzed under given scenarios in order to conduct financial analysis on the generating units.

Strategic Advisory Services: Recently, Ms. Scheller managed a project for a municipal utility which including assessment of their entire operations, staff functions, supply procurement, financial accounting, rate design, and risk management policies. The main goal of the project was to provide the 5 year business plan or road-map which the utility could use to guide forward development and ensure cost recovery. Ms. Scheller recently served as Project Director on an assignment for the Polish Power Grid Company. The overall assignment included a review of the regulatory and market risks faced by PPGC and provided options on how to evaluate and plan for these risk elements. Ms. Scheller has also provided strategic advisory services to a northeast utility to assist them in dealing with dynamic power market issues.

Transmission and Distribution Analysis: Ms. Scheller has assisted in designing an approach for use in the SUPERGEN project related to sustainable power generation and supply in the United Kingdom. The component of the analysis focuses specifically on the effect of development of intermittent power supply sources such as wind on the reliability of the power system. Further, the analysis will examine

the possible evolution paths of the generation mix and the associated transmission issues. In addition to forward planning exercise, Ms. Scheller has managed several projects focusing on the impact of physical transmission constraints on the dispatch of power facilities in various markets in the US. This work has included detailed location marginal price forecasting and congestion analysis. Ms. Scheller has testified on siting issues for transmission and distribution lines.

Fuel Market Analysis: Ms. Scheller has led efforts to determine natural gas, oil, and petroleum coke price forecasts for the US markets. These forecasts include detailed review of the transportation networks and availability of supply sources.

Renewable Market Analysis: Ms. Scheller recently led a project to support the financing of two merchant wind development projects. The analysis included a detailed review of the transmission network and potential issues resulting from the development of the facilities. Further, the analysis considered the potential capacity value associated with the variability of the system. In addition, Ms. Scheller has in numerous analyses considered the impact of renewable generation portfolio standards in various power markets.

International Analysis: Ms. Scheller has led projects focused on integrated resource planning in several developing countries including Armenia, Azerbaijan, and the Republic of Georgia. Analysis included detailed review of the power grid and steam demand and supply capabilities for several of these markets with large combined heat and power needs.

PROJECT EXPERIENCE

- Assisted in the analysis of coal transportation costs via rail lines to utilities in select areas. The analysis is to be used in a coal contract dispute to be heard by the Interstate Commerce Commission.
- Involved in the preparation of ICF Resources' Energy Service. Responsibilities included collecting and analyzing data on issues such as current developments in the oil, gas and coal industries, oil production in OPEC and Non-OPEC countries, oil demand, coal mining productivity trends, acid rain regulation, and electricity and non-utility demand for coal and gas. Analyzed the potential effects of such issues on the demand for energy.
- Assisted in the development of a model to determine the effect of delivered fuel prices on electricity system dispatch. The model was prepared to assist a rail carrier develop a strategic pricing policy and analyzed six different electric utility systems in the rail lines' area of operation.
- Assisted in developing and modifying a model to estimate the hourly marginal energy prices for utilities operating in various regions of the country. The model allows for variations in transmission capacities across regions, demand, fuel prices and transportation costs, and several other variables.
- Prepared a report on produced water treatment technologies including detailed explanations of new technologies available to petroleum producers. Broad topics discussed included characteristics of produced water, current treatment and disposal technologies, major technical and economic issues concerning produced water treatment, and opportunities for future research and development. The report also characterized the capital and operating costs of the various treatment technologies.
- Assisted in preparing a report of environmental costs that have not been traditionally reflected in oil prices. The paper included analysis of approaches used for quantifying unincluded costs (externalities), estimates of the value of unincluded costs, potentially unincluded costs and benefits, and trends that may affect unincluded costs.

- Assisted in preparing a report outlining the effects of oil imports on the domestic oil industry. This report included an analysis of the impact on imports on domestic production, employment, earnings, and exploration trends over time. The report also included analysis of the implications of foreign incentives, resource requirements, technology, and undeveloped supply locations on domestic production and refining.
- Examined trends in coal prices, sulfur content, and energy capacities for various grades of coal supplied from different locations across the nation. She developed and managed a database of coal buyers and suppliers, prices, grades, heat content, and other relevant information to assist expert staff in developing evidence to be used in testimony.
- Assisted in research to determine if proposals to expand the list of chemicals required to be reported under the Toxic Release Inventory Act (TRI) would be beneficial. Research included determining the quantity and strength of emissions from various sources.

PREVIOUS EXPERIENCE

Prior to joining ICF, Ms. Scheller assisted expert economists in analyses of public policy issues, antitrust and other commercial litigation matters. She conducted research on markets and industries using sources such as government agencies, trade associations and on-line databases, and developed and managed databases used in economic damage models. Highlights of her work experience include:

- Economic analysis of environmental damage due to illegal dumping under Section 106 of CERCLA;
- Impact analysis of proposed changes to business tax incentives in Puerto Rico;
- Impact analysis of proposed policy changes on employees in the maritime industry.

COMPUTER KNOWLEDGE

- Proficient in Microsoft Office Professional Edition. Experienced user of WordPerfect, Freelance, MapInfo, Lotus 1-2-3.
- Background using Windows NT/2000/2003 Server, Windows 9x, DOS, UNIX, CMS, VAX, LAN, and Macintosh.
- Programming in SAS, dBase, FoxPro, MSAccess Basic, SPSS, MINITAB, and Turbopascal.
- Experienced in many industry models and databases: IPM®, WIPM™, WPMM™, DARWIN, NERC ES&D, CEMS, BaseCase, NewGen, UDI, Bloom Fuel Cell Projectberg, SNL, and components of the Energy Velocity Suite.

PUBLISHED PAPERS AND CONFERENCE ENGAGEMENTS

- "Environmental Regulation Compliance Planning" presentation to S.E.E. Integrated Resource Task Force, September 20, 2011.
- "Transmission and Capacity Pricing Constraints," presentation at conference: ENERDAT's GasFair & PowerMart, Toronto, Ontario, April 20, 1999.
- "GenCo Opportunities- Developing A Successful GenCo," presentation at conference: IBC's Developing a Successful GenCo, Atlanta, Georgia, December 7, 1998.
- "Using Modeling Tools for Market Price Forecasting," presentation at conference: IBC's Market Price Forecasting Conference, Baltimore, Maryland, August 26, 1998.
- "Wholesale Power Markets Model," presentation at conference: Infocast's Market Price Forecasting Conference, New York, New York, August 6, 1998.

- "Introduction to Short-Term Power Price Forecasting"; WPMM Advanced User Training; WPMM Introductory Session; WPMM User Group Houston, Texas, 1996.
- "Using Price Forecasting Tools"; WPMM User Training; WPMM User Group, Fairfax, Virginia, 1996.
- Financial Engineering in the Power Sector, Public Utilities Fortnightly: January 1, 1997, with Judah Rose and Shanthi Muthiah.
- Lack of Competition in the Wholesale Marketplace for Power Generation: Does it Make a Difference, The Electricity Journal: Jan/Feb 1997, with Judah Rose and Shanthi Muthiah.

REGULATORY PRESENTATIONS AND TESTIMONY

- Oral Rebuttal Testimony on behalf of Virginia Electric and Power Company before the State Corporation Commission of Virginia Case No. PUE-2011-00073, January 2012.
- Rebuttal Testimony on behalf of Virginia Electric and Power Company before the State Corporation Commission of Virginia Case No. PUE-2011-00073, December 2011.
- Oral Direct Testimony of Maria F. Scheller on behalf of Delmarva Power & Light Company before the Delaware Public Service Commission concerning New Tariffs for Qualified Fuel Cell Providers – Renewable Capable, Docket No. 11-362, October 18, 2011.
- Direct Testimony of Maria F. Scheller on behalf of Delmarva Power & Light Company before the Delaware Public Service Commission concerning New Tariffs for Qualified Fuel Cell Providers – Renewable Capable, Docket No. 11-362, August 19, 2011.
- Oral Direct Testimony of Maria Fusco Scheller on Behalf of Western Massachusetts Electric Company concerning Non-Transmission Alternatives (related to the Greater Springfield Reliability Project), before the Commonwealth of Massachusetts Energy Facilities Siting Board, Docket No. EFSB 08-2/DPU 08-105/DPU 08-106, November 17, 2009.
- Direct Testimony of Maria Fusco Scheller on Behalf of Western Massachusetts Electric Company concerning Non-Transmission Alternatives (related to the Greater Springfield Reliability Project), before the Commonwealth of Massachusetts Energy Facilities Siting Board, Docket No. EFSB 08-2/DPU 08-105/DPU 08-106, July 17, 2009.
- Direct Testimony of Maria Fusco Scheller on Behalf of Connecticut Light and Power concerning Non-Transmission Alternatives (related to the Greater Springfield Reliability Project), Before the State of Connecticut Siting Council, Docket No. 370, July 7, 2009.
- Panel Testimony before the Maryland Public Service Commission Concerning Delmarva Power and Light's Integrated Resource Plan, with Jack Barrar representing PEPCO and Frank Graves of the Brattle Group, December 2008.
- Rebuttal Testimony on behalf of Virginia Electric and Power Company before the State Corporation Commission of Virginia Case No. PUE-2008-00014, September 2008.
- Direct Testimony on behalf of Delmarva Power and Light before the Delaware Public Service Commission Concerning an Approval of Land-Based Wind Contracts, July 2008.
- Testimony on behalf of Delmarva Power and Light to the Delaware Senate Energy and Transit Committee related to Delaware House Bill 6, March 7, 2007.

- Rebuttal Testimony on behalf of Excelsior Energy, Inc, MPUC Docket No. E-6472-/M-05-1993, in support of approval of the Proposed Mesaba Energy Facility Power Purchase Agreement. October 10, 2006 and November 10, 2006.
- Presentation of findings of the 2005 Avoided Energy Supply Costs, Vermont Public Service Commission, August 25, 2006, with Leonard Crook.
- Prepared intervener testimony on behalf of Excelsior Energy in the NSP IRP proceedings for submission to the Minnesota Public Utilities Commission, 2005.
- Oral Testimony regarding Certificate of Need for the Warren County Transmission Expansion, Kentucky Public Service Commission, September 21, 2005.
- Presentation "Analysis of an IGCC Coal Power Plant" to Minnesota State House of Representative Committees, January 22, 2002, with Judah Rose.
- Presentation "Analysis of an IGCC Coal Power Plant" to Minnesota State House of Representative Committees, January 15, 2002, with Judah Rose.
- Analysis Related to Merchant Plant Siting in South Carolina, Public Utilities Commission of South Carolina, Summer 2002, with Judah Rose and Kojo Ofori-Atta.

EMPLOYMENT HISTORY

ICF Resources Incorporated	Vice President	2001-Present
ICF Resources Incorporated	Principal	2000
ICF Resources Incorporated	Senior Project Manager	1999
ICF Resources Incorporated	Project Manager	1998
ICF Resources Incorporated	Senior Associate	1997
ICF Resources Incorporated	Associate	1996-1997
ICF Resources Incorporated	Analyst	1994-1996
Nathan Associates	Research Assistant	1992-1994
The Pennsylvania State University	Teaching Assistant	1991-1992
IBM	Intern	1991

TAB 18
Troy Alan K. Tanaka, E.I.T.

Troy Alan K. Tanaka, E.I.T.

Expertise

- Substation Physical Design
- Relaying and Controls
- Power Transformers
- Field Engineering Support

Education

- B.S., Electrical Engineering Tulane University School of Engineering, with Honors, New Orleans, LA, May 1995

Organizations

- IEEE
- IEEE Transformers Committee

Registration

- Engineer in Training – Louisiana, 16202

Years Experience

17

Years With Other Firms

5

Start Date

September 2000

Mr. Tanaka is an electrical engineer with project management, protection and control, and physical design experience in the Transmission & Distribution Division. His responsibilities include project management, protection and control, physical design, field engineering support and material procurement.

Below is a partial list of projects for which he has provided assistance:

345-kV/115-kV NEEWS T-Line Project, Northeast Utilities Service Company

Card Street Substation, Lebanon, Connecticut, 2011 - Present
Lake Road Substation, Dayville, Connecticut, 2011 – Present
Killingly Substation, Putnam, Connecticut, 2011 – Present
Substation Project Manager for three 345-kV Substations associated with Interstate Reliability Project. Responsibilities include project management of engineering team, and procurement of major equipment.

345-kV/115-kV NEEWS T-Line Project, Northeast Utilities Service Company

Fairmont Switching Station, Chicopee, Massachusetts, 2008 - Present
Cadwell Switching Station, Springfield, Massachusetts, 2008 - Present
Project Manager for two 115-kV greenfield switching stations. Physical design manager for all substations on Greater Springfield Reliabity Project. Responsibilities include project management of engineering team, project management of two EPC contractors, procurement of major equipment, and overall supervision of physical design for eighteen substations.

230-kV Aquasco Substation 200, PEPCO

Aquasco, MD, 2008 – 2009
Lead Substation Engineer for a 230-kV green field substation. Responsibilities include physical design and assisting with project management.

345-kV M/N T-Line Project, Northeast Utilities Service Company

Beseck Switching Station, Wallingford, Connecticut, 2004 – 2007
East Devon Substation, Milford, Connecticut, 2004 – 2008
Norwalk Substation, Norwalk, Connecticut, 2004 – 2008
Scovill Rock Switching Station, Middletown, Connecticut, 2004 – 2006
Lead Substation Engineer for a 345-kV transmission line project. Responsibilities include design, and retrofit to two existing substations including a 345-kV GIS and management of EPC Contractors for two new green field substations. Participated with the procurement of major equipment including 345-kV GIS, 345/115-kV Transformers, Breakers, Switches, Shunt Reactors, and Series Reactors. Witnessed factory testing for 345-kV GIS and 345/115-kV Transformers.

230-kV T-Line Project, Silicon Valley Power

230-kV Switching Station, San Jose, California, 2003 – 2005
Kifer Substation, Santa Clara, California, 2003 – 2005
Northern Receiving Station, Santa Clara, California, 2003 – 2005
Raymond Substation, Santa Clara, California, 2003 – 2005
Protection, Controls, and Physical Design Engineer for an EPC 230-kV Transmission Project. Responsibilities include physical layout and design, panel layout, relaying and controls, raceway, cabling, grounding, assistance with procurement of materials, coordination with vendors, and onsite technical support during the construction and testing of systems.

500-kV T-Line Project, Pacific Gas & Electric
Gates Substation, Huron, California, 2004
Los Banos Substation, Los Banos, California, 2004
Field Support Engineer for an EPC 500-kV Transmission Project. Responsibilities include onsite engineering of modifications at 500-kV Substation.

230-kV Capacitor Bank Replacement, Pacific Gas & Electric
Gates Substation, Huron, California, 2004
Los Banos Substation, Los Banos, California, 2004
Protection and Controls Engineer for an EPC 230-kV Capacitor Bank Installation at two existing substations. Responsibilities include the design of the protective relaying system.

PG&E Cayetano Substation, Pacific Gas & Electric
Livermore, California, 2002 – 2003
Design Engineer for a green field EPC 230-kV/21-kV Substation. Responsibilities include physical layout and design, relaying and controls, raceway layout, cabling, grounding, and assistance in procurement of materials.

PG&E Ignacio Substation, Pacific Gas & Electric
Novato, California, 2002
Protection and Controls Engineer on an Engineering and Procurement 420 MVA 230/115-kV Transformer Bank addition. Responsibilities included 115-kV Breaker replacement, addition of slip-on CT's, relaying & controls, and addition of new transformer bank with high side circuit breaker.

PG&E Bay Meadows Substation, Pacific Gas & Electric
San Mateo, California, 2002
Electrical Engineer for the installation of a reclosing blocking scheme at Bay Meadows Substation. Responsibilities included panel layout, schematic diagrams, and bill of materials.

PG&E Bay Kingsburg Substation, Pacific Gas & Electric
Kingsburg, California, 2002
Protection and controls engineer for 115/12-kV transformer bank. Responsibilities include replacement of 115-kV transformer bank, installation of new 115-kV breaker, and protective relaying.

345-kV Zeeland Substation – Phase II, Mirant
Zeeland, Michigan, 2001
Protection, Controls, and Physical Design Engineer for 345-kV Zeeland Substation-Phase II. Responsibilities for protection and controls package as well as detailed physical design and coordination.

Various Substations, Pacific Gas & Electric
Newark Substation, Newark, California, 2001
Ravenswood Substation, San Mateo, California, 2001
San Mateo Substation, San Mateo, California, 2001
Tesla Substation, Tracey, California, 2001
Electrical Engineer for Tesla (500-kV), Ravenswood (230-kV), Newark (230-kV) and San Mateo (230-kV) substation projects. Projects included additions of new lines, additions and modifications to protective relaying and addition of new 230-kV circuit breakers.

Municipal Electric Authority of Georgia
Georgia, 2000
Electrical Design Engineer for design of new 115/12-kV substation.

McDonnell Douglas/The Boeing Company
St. Louis, Missouri, 1996 – 2000
F-15 Armament/Flightline SE Engineer. Managed and coordinated the design, development, integration, and delivery of Armament/Flightline Support Equipment to domestic and foreign customers. Supported EMD programs, flight test programs, productionization programs, and field support issues involving support equipment.

McDonnell Douglas Corporation,
St. Louis, Missouri, 1995 – 1996
F-15 TISS SE Engineer. Performed software coding and integration for various Line Replaceable Units (LRUs) on the Tactical Electronic Warfare System Intermediate Support System (TISS) Program. Managed the delivery of TISS Interface Test Adapters for a foreign customer.

Hawaiian Electric Light Company, Hilo, Hawaii
1994
Production Department Summer Intern. Supported the design of multiple relay upgrades for 69-kV lines at existing substations. Proposed and designed under-frequency relay project to meet load shedding studies.

Harold H. Miura, Inc., Hilo, Hawaii
1993
Engineering Assistant. Utilized AutoCAD to update electrical schematics. Modified software to correct errors in load calculation program. Edited wiring diagrams to meet design specifications

TAB 19
Roger C. Zaklukiewicz

ROGER C. ZAKLUKIEWICZ
1945 Abordale Lane
The Villages, Florida 32162

I am a consultant for the Northeast Utilities System (NU).

1960-1964 United States Air Force

Education

1966 Bachelor of science in electrical engineering from the University of Hartford.

1967 Master of science in electrical engineering from Philip Sporn Chair at Rensselaer Polytechnic Institute.

I joined CL&P in 1966 as a cadet engineer and held progressive engineering positions in Distribution Engineering, Protection Engineering, and Substation Engineering. From 1977, I have held the following management positions:

1977-1980 Supervisor of Protection Engineering for all transmission and distribution facilities;

1980-1981 Supervisor of CL&P Distribution Planning Engineering. Responsible for developing the CL&P capital and expense annual and long multi-year plan, programs, and budget;

1981-1984 Manager of Substation Construction for NU. Responsible for all substation construction and major maintenance performed on all substations in the CL&P and Western Massachusetts Electric Company (WMECo) service territories;

1984-1990 Director of Transmission, Construction Test & Operations. Responsible for all transmission line and substation engineering, construction, maintenance, testing, and operations. Responsible for test activities at all NU generating facilities, including Millstone and Connecticut Yankee Nuclear Generating Stations. Responsible for all CONVEX operational and dispatching activities, the construction, maintenance, and operation of all NU process computer systems and microwave and power line carrier telecommunications facilities;

1990-1996 Vice President - Transmission & Distribution. Responsibilities included engineering, construction, maintenance, test, and operations of all T&D facilities on the NU system;

1996-2001 Vice President - Transmission & Distribution Operations;

2001-2003	Vice President - Transmission Engineering Operations. Responsibilities included engineering, construction, maintenance, test and operations of all transmission facilities on the NU system;
2003-2005	Vice President - Transmission Projects for the NU System. Responsibilities include the engineering, project management, construction, and in-service commissioning of NU's transmission facilities including transmission lines and substations, telecommunications, Supervisory Control and Data Acquisition (SCADA) development and implementation associated with transmission equipment and facilities, and for the company's land management and real estate activities;
2005-May 2006	Vice President - Transmission Technical Support.

From August 2006 to the present, I have been employed as a consultant for the Northeast Utilities System supporting the development of large inter-area transmission projects.

Professional Affiliations

I have been actively involved with the following regional and national committees:

1977-1980	Institute of Electric and Electronic Engineers Protective Relaying Committee. Co-chaired the Breaker Failure Working Group which developed and published the Breaker Failure Guide. Past member of the Generator Grounding and Substation Bus Protection Working Groups. The Generator Grounding Working Group developed and published the Generator Grounding Guide;
1981-1990	Member of Edison Electric Institute Transmission Committee. Chaired the Protective Relaying Working Group, Member of Executive Committee, and Liaison to OSHA;
1989-1998	NU representative to NEPOOL Operations Committee;
1990-2004	NU member representative to Northeast Power Coordinating Council (NPCC);
1993-2004	Member of NPCC Task Force on Coordination of Operations;
1990-2004	Member of NPCC Reliability Coordinating Committee. Chaired the Committee from 1997 through 2001;
1997-2002	Member of North American Electric Reliability Council (NERC) Planning Committee (Previously designated Engineering and Adequacy Committee);
2001-2004	Member of the NERC Planning Committee Resources Task Force; Member of the NERC Planning Reliability Model Task Force.