Hugh O. Nash, Jr PE, FIEEE, FASHE hugh@nash-consult.com
Consulting Electrical Engineer Cell: 615-268-3793

Services and Specialties

Hugh Nash has 44 years of experience in the practice of electrical engineering and is licensed to practice in 35 states. He has worked in (a) the paper industry designing controls for automated production and materials handling systems; (b) the electric utility industry designing distribution, transmission, and substation equipment up to 115 KV; (c) the electrical contracting business constructing commercial and industrial facilities and municipal treatment plants; and (d) the consulting engineering business with concentration on standby and emergency power systems, healthcare facilities, and mission critical facilities. His specialties include:

Emergency and Standby Power Systems

Synchronizing Switchgear for the Parallel Operation of Generators

Peak Shaving and Co-generation Plants with and without Utility Paralleling

Mission Critical Electrical Systems for Data and Co-location Facilities

Health Care Facilities, including MEPT Facility Assessments

Coordination and other Power System Studies

Commissioning of Electrical, Standby Power, and Mission Critical Facilities

Accident Investigations and Forensics

Electrical Safety and Arc Flash Protection

Electrical Training Seminars

Education

Bachelor of Engineering, Electrical Engineering, Vanderbilt University, 1967

Master of Engineering, Electrical Engineering, Tennessee State University, 1984

Professional Registration

National Council of Examiners for Engineering and Surveying
Registered Professional Engineer in the states of AL, AR, AZ, CA, CO, DE, FL, GA, HI, IL, IN, IA, KS, KY, LA, MA, MI, MS, MO, NB, NV, NH, NM, NC, OH, OK, PA, RI, SC, TN, TX, UT, VA, WA, and WY.

Affiliations

Institute of Electrical and Electronic Engineers (IEEE) - Fellow

American Society for Healthcare Engineering- Fellow

NFPA 70, National Electrical Code Panels 17 and 15 (Article 517, NFPA 70), Technical Committee for Health Care Facilities (1980– Present)

Past Chairman, NFPA 99 Electrical Systems Committee (1993-2005)

NFPA 99 Electrical Systems Committee (1989-Present)

Past Chairman, IEEE White Book Working Group, *Recommended Practice for Electric Systems in Healthcare Facilities*, first three editions (1979-2007)

Health Care Guidelines Revision Committee for the *Guidelines for Construction and Equipment of Hospitals and Medical Facilities* (1990-2010)

Facilities Guidelines Institute (FGI), Board of Directors (2003-2010)

NFPA 110, Technical Committee for *Emergency & Stand-by Electrical Systems* (2002-Present)

NFPA 111, Technical Committee for Stored Electrical Energy *Emergency & Stand-by Electrical Systems* (2002-Present)

Served on the inaugural ASHE Planning Design & Construction Committee.

ASHE/AIA/Defense Department Committee to Study the Cost of Military Hospitals

Awards

Elected IEEE Fellow in 1997.

IEEE, Nashville Section, 1994 "Engineer of the Year"

IEEE Commercial Buildings Committee Prize Paper Award for "An Analytic Look at Standby Diesel Engine Generator Loading."

IEEE Commercial Buildings Committee Prize Paper Award for "Fire Alarm Systems in Health Care Facilities."

IEEE Centennial Medal for outstanding contribution to the Institute of Electrical and Electronics Engineers (IEEE), 1984. Only 1884 medals awarded worldwide, celebrating the IEEE's 100^{th} anniversary.

IEEE Commercial Buildings Committee Prize Paper Award for "Power Systems Disturbances and Considerations for Power Conditioning

IEEE Industrial and Commercial Power Systems Department Prize Paper Award for "Power Line Disturbances and Considerations for Power Conditioning."

IEEE Standards Medallion for the IEEE White Book, May, 1986

IEEE Power Systems Protection Committee Prize Paper Award for "The Truth About Standby Generator Excitation Support Systems."

IEEE Industry Application Society Honorable Mention for "Ground Fault Protection and the Problem of Nuisance Tripping of Critical Feeders (4th place out of 400 papers submitted).

National Electrical Code Quarter Century Award, 2007

U. S. Department of Defense Commendation, 2003

NFPA Committee Service Award, 2006

IEEE – SA Standards Board Award for the IEEE White book, 2007

Selected Projects

Our Lady of the Lake – Baton Rouge, LA
Paralleled 6-1750 kW 13.2 kV generators and new main and paralleling switchgear with provisions for synchronizing generators with electric utility. Replace existing hospital 4000A 480Y/277V double-ended main-tie-main switchgear, and installed 2-1750 essential system generators with paralleling switchgear. Replace hospital essential system transfer switches.

Baptist Hospital – Nashville, TN
Parallel operation of 3-1600 kW units with Nashville Electrical Service secondary network

Wright Patterson Air Force Medical Center – Dayton, OH
$150 million addition including 2-600 kW (480V) paralleled, 2-2000 kW (EMD locomotive engines, 4.16 kV) paralleled

St. Thomas Hospital – Nashville, TN
Paralleling systems modifications – replaced 2-900 kW units with 2-1750 kW Modified existing synchronizing gear for 4-1750 kW with chillers served from the standby generators and utility paralleling for utility load reduction.

Wake Forest University Baptist Medical Center – Winston-Salem, NC
Three new 2000 KW 4160V standby generators with paralleling switchgear to replace four existing 480V generators. System serves Cancer Center, Ardmore Towers, Reynolds Tower, centrifugal chillers, and central plant.

Columbia/HCA Information Services Center – Nashville, TN
3-750 kW generator installation and synchronizing system and redundant 3-500 KVA UPS system, and telecommunications

Columbia/HCA – Nashville, TN
Y2K Preparedness Report and Protocol to help 200 hospitals improve their readiness.

Corporate Computer Center, Order of St. Francis - Peoria IL
Original design and upgrade for blade servers

VA Medical Center, Nashville, TN
$4.5 million electrical project
Replacement of existing normal and emergency switchboards, including the
Replacement of the existing Nashville Electrical Service transformers and main switchboard with two 2-2000 KVA transformer networks, each feeding a double-ended (main-tie-main) service switchboard.

Northwestern Memorial Hospital – Chicago, IL
Provided complete systems design for $300 million (GC) hospital, telecommunications portion was $15 million. Telecommunications systems design including voice/data/wireless infrastructure, nurse call, overhead paging/intercom, CCTV/security/access control, PBX, EMS Radio, and LAN/WAN hardware.

Level 3 Communications – St. Louis
Upgrade, including new STS/PDUs, 500 KVA UPS addition, and 8000 SF Raised Floor Addition for existing Co-location Facility. Provided coordination study.

Hammond Developmental Center - Hammond, LA
2000 KW, 13.8 KV Standby Generator with 10,000 and 4000 gallon fuel tanks and modification to the existing 13.2 KV switchgear and controls and breaker for a second (future) 2000 KW unit.

Children's Hospital – New Orleans, LA
Designed modifications to the existing hospital essential system generators which consisted of 2-750 KW generators paralleled at 480V and a second system consisting of 3-750 KW generators paralleled at 480V. The paralleling systems were combined to provide for the parallel operation of 5-750 KW generators on a common split bus. The

system effectively provided sufficient capacity for the operation a an additional 900-ton centrifugal chiller on the essential system. This additional capacity and redundancy was made available without the addition of a single KW of generator capacity and saved the hospital over a million dollars.

Vanderbilt University Medical Center – Nashville, TN
Replaced 4.16 KV switchgear and distribution system for Medical Center North

Forensic Studies and Court Testimony for Hurricanes Allison (Houston) and Katrina (New Orleans)

Selected Publications

Author of over 50 articles and papers on emergency and standby power, computer power, hospital electrical design, telecommunications and fire alarm systems, ground fault protection, electrical safety, project and quality management, and codes. A complete list of publications is available upon request.

Contributed to the *Healthcare Facilities Handbook* (NFPA): 1993, 1996, (Gardner); 1999, 2002 (Klein); 2005 (Bielen)

Chairman of the Working Group responsible for publishing the first (1985), second (1995), and third (2007) editions of the IEEE White Book (*Recommended Practice for Electric Systems in Health Care Facilities*). The third edition co-chaired with Walt Vernon.

Author of the *Handbook on Electrical Systems,* published by the America Society for Healthcare Engineering of the American Hospital Association, 2004.

Author of AHA Management and Compliance Series Volume VII *Hospital Electrical Systems*, 1992.

Contributed to the IEEE *Gray Book* (commercial buildings), *Orange Book* (Emergency and Standby Power Systems), and *Emerald Book* (Powering and Grounding Sensitive Electronic Equipment)

V. James McLarney (Editor), *Effective Healthcare Facility Management,* Co-author of Chapter 1, "Engineering and Maintenance" (with Lipsey, Barrick, and Blount), June, 1991.

"Power System Disturbances and Considerations for Power Conditioning," IEEE I&CPS Conference and *IEEE Transactions on Industry Applications,* vol. IA-21, no. 6, pp. 1472-1481, November/December 1985 (with Dr. Francis M. Wells).

"Distributed Generation in Facilities," presented at the American Society for Healthcare Engineering at the 44th Annual Conference and Technical Exhibition, July, 2007, New Orleans. Also published in *Inside ASHE*, Nov/Dec 2007.

"The Truth About Standby Generator Excitation Support Systems," *IAS Transaction*, Vol. 26, No. 4, July/Aug, 1990.

"More About Hospital Standby Generator Grounding, GFP, and Currents That Go Bump In The Night," IAS Meeting Conference Record, San Antonio, October, 1995. Published in IEEE/I*AS Transaction, Vol. 26, Issue 3, May/June, 1990.*

"An Analytical Look at Standby Diesel Engine/Generator Loading," IAS Transaction, Sept/Oct, 1982.

"Power Systems Disturbances and Considerations for Power Conditioning," IAS Transaction, Vol. IA-21, No.26, Nov/Dec, 1985, Dr. Francis M. Wells.

"Ground-Fault Protection and the Problem of Nuisance Tripping of Critical Feeders," *IAS Transaction*, Vol. 26, May/June, 1990.