

Credentials

Professional Engineer

Iowa License #7248 PE

Nebraska License #E8363

City of Des Moines Electrical Contractor

Federal Communications Commission

First Class Radiotelephone license with radar endorsement

General Class Amateur Radio Operators license

Education

Master of Electrical and Electronic Engineering

Iowa State University, 1986

Bachelor of Science in Electrical Engineering

Iowa State, University, 1969

Professional Associations

Institute of Electrical and Electronics Engineers

Section Chairman, 1993 - 1994

Section Vice Chairman, 1992 - 1993, 1990 - 1991

Section Secretary/Treasurer, 1991- 1992

Iowa Engineering Society

Scholarship Committee, 1996

Continuing Education Committee 997

National Society of Professional Engineers



Professional Experience

Institute for Products, Engineering & Construction **1997 to Present**

Consulting forensic engineering services in the field of electrical engineering. Emphasis on workplace safety and accident prevention, industry standards, product and premises liability, electrical construction and design analysis.

Consulting Engineer **1995 to Present**

Consulting Engineers in the field of utility system design, including analysis and design of distribution systems, substations, relay and control, and industrial systems.

MidWest Power **1967 - 1995**

Formerly Iowa Power, now Mid-American Energy Co. Served in various capacities ranging from Student Engineer through Engineering Manager.

Manager, Distribution System Design **1992 - 1995**

Responsible for engineering activities relating to the Des Moines area distribution system, including new commercial and industrial services, residential plat designs, system extensions, rebuilds and upgrades, system analysis, budgeting, and storm restoration.

Manager, Substation Engineering **1988 - 1992**

Responsible for all engineering activities relating to Iowa Power substations, relaying and control, and the downtown Des Moines underground system.

Supervisor, Substation Engineering **1983 - 1988**

Responsible for all engineering activities relating to Iowa Power substations, relaying and control, and the downtown Des Moines underground system.

Supervisor, Planning and Standards **1982 - 1983**

Responsible for all engineering activities relating to the downtown Des Moines underground system, distribution standards, and long range transmission and distribution planning.

Supervisor, System Engineering **1979 - 1982**

Responsible for all engineering activities relating to the downtown Des Moines underground system, the Des Moines area distribution system, and large customers in the Des Moines area.

Senior Engineer **1974 - 1979**

Responsible for engineering projects as assigned in the areas of the downtown Des Moines underground system and the Des Moines area distribution system.



Selected Major Projects and Accomplishments

- 1997 Completed feasibility studies for the installation of community broad band communications systems for the Cities of Indianola and Waverly, Iowa.
- 1996 Completed engineering for the conversion of the town of Tipton, Iowa from 2.4 kV to 12.47 kV.
- 1988 - 1995 Supervised the design for the conversion of several major downtown facilities from 4 kV to 13 kV
- 1994 - 1995 Developed a system design concept integrate the electric utility service and emergency generation provisions for the Principal Financial Group in downtown Des Moines.
- 1994 Served as expert witness and case coordinator in the successful defense of a court action relating to the Horizons East apartment building fire.
- 1992 - 1993 Supervised the design of revisions to two downtown transformer vaults to reduce magnetic fields In adjacent office space.
- 1991 - 1992 Supervised the preliminary design of two new 345 kV switching stations and one new 345 - 161 kV substation.
- 1990 Supervised the design and construction of the distribution system for serving the 45 floor Principal Financial Building in downtown Des Moines.
- 1989 Initiated a program to replace the Company SCADA and EMSsystem.
- 1989 Prepared criteria for the evaluation of transmission and substation system reliability.
- 1987 Prepared a plan for the conversion of 4 kV downtown Des Moines underground system to 13 kV, and began a systematic program to complete the project over a 10 year period.
- 1983 Supervised the preparation of a long range transmission plan for the Iowa Power system.
- 1980 Designed a training facility for URD distribution systems, developed and presented a training program for linemen and engineering personnel utilizing the facility.

- 1974 - 1980 Designed the primary distribution system to serve several large buildings constructed in the downtown Des Moines area.
- 1974 Developed and implemented a ground fault detection system for the protection of 480 volt spot network installations.
- 1972 Designed the distribution system to serve the 35 floor Ruan building in downtown Des Moines.

Committee and Task Force Assignments

Internal to MidWest Power and Iowa Power

- 1993 - 1995 Distribution Automation Committee
- 1993 - 1995 EMF Policy Committee
- 1992 - 1995 Underground Distribution Standards Committee
- 1985 - 1995 Underground Safety Committee
- 1982 - 1995 Underground Splicer Apprenticeship Committee, Chairman, 1985 - 1995
- 1993 Distribution Transformer Standardization Committee
- 1987 - 1991 Substation Safety Committee
- 1987 - 1988 System Reliability Study Committee

External Assignments Representing MidWest Power and Iowa Power

- 1991 - 1995 EPRI Project Advisor for EMF Shielding Project
- 1992 - 1994 EPRI Industry Advisory Task Force on Transmission Substations, Chairman, Transformer Subcommittee, 1994
- 1994 EPRI Transmission Substation liaison to EMF Advisory Group
- 1987 - 1990 Missouri Valley Electric Association
 - General Chairman, Engineering Conference, 1990
 - Vice General Chairman, Engineering Conference, 1989
 - Chairman, Substation Committee, 1988
 - Vice Chairman, Substation Committee, 1987



Educational and Teaching Activities

Power Systems Operations 1995 - Present
This is a 3 day class that has been prepared by Professional Training Systems (PTS) and is being presented by Mr. Powers at various locations on an ongoing basis.

Distribution Engineering 1995 - Present
This is a 2 day class that has been prepared by Professional Training Systems (PTS) and is being presented by Mr. Powers at various locations on an ongoing basis

Power Quality Seminar 1997
Presented for the City of Ames, Iowa for their industrial and commercial customers.

Industrial Electrical Maintenance Seminar 1996
A one day short course presented for the Eaton Corporation in Red Oak, Iowa.

Distribution Voltage Control Short Course 1995
A presentation for Iowa State University in Ames, Iowa.

Basic Electricity and Wiring 1995
A series of six 2-hour sessions presented to traffic control technicians and other employees the West Des Moines Department of Public Works.

Distribution System Planning and Design 1995
A presentation for an Iowa State University short course.

Distribution Engineering 1994
A one semester graduate level course that was developed and presented in conjunction with John Lamont, Ph.D. at Iowa State University.

Distribution training sessions 1993
A series of approximately 40 2-hour, in-house sessions that was developed and presented to less experienced engineers and technicians as an introduction to the MidWest Power distribution system.

Balloon Safety and Power Lines 1987 - 1993
A 1 -hour program that has been p meeting of the Central Iowa Hot Air Balloon Association a total of three times.

Design and Construction of Substations 1989 - 1991
A presentation on all aspects of substation design and operations for an Iowa State University short course, presented at three different times.



Capacitor / Power Factor Correction 1988
A one-half day seminar that was presented to MidWest Power commercial and industrial customers in south-west Iowa.

Apprenticeship Programs 1970 - 1989
Prepared and presented classroom sessions for Inside wiremen and elevator mechanics.

Adult Education Courses 1970 - 1986
Prepared and presented a variety of courses for the DesMoines Public School System and for the Des Moines AreaCommunity College, including classes on basic electricity, house wiring, Industrial controls, electronics, integrated circuits, and microprocessors.

Power System Grounding 1987
A presentation to a state convention of electrical inspectors.

Overcurrent Protection and Arcing Faults 1986
A presentation to the Iowa Governor's Safety Conference.

Distribution Capacitor Training Program 1985
A program that was developed and video taped for MidWest Power, and that has been presented to numerous line crew, engineering, and technician personnel.

