

GEORGE W. FLEW

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EXPERIENCE

- 2015 to Present **Retired at Taigan Drama**, Knoxville, TN. Responsible for development of the3DUtility, ancestry research and refurbishing a 1966 Mustang.
- 2005 to 2015 **Vice-President of Engineering, Jackson Energy Authority**, Jackson, TN.
Responsible for supervision of all JEA Engineering including Electric, Gas, Water and Wastewater. The current operating budget for the Engineering Dept. is \$1.3M in payroll and \$6.3M in capital expenditures.
- 2002 to 2005 **Vice-President of Information Systems, Jackson Energy Authority**, Jackson, TN.
Responsible for operation of all JEA IS facilities including multi-server pc network, desktop pc, printers and plotter, IBM AS400 system and fiber-optic network. Directed approximately twelve IS professionals and technicians. Software systems included desktop Windows OS, OS400, Office, AutoCad, GE SmallWorld GIS, HSQ SCADA, ORCOM CIS, JD Edwards ERP (Oracle), MS SqlServer, MS VB. In addition, wrote programs for budgeting, vehicle maintenance and tracking, work order production and employee information.
- 1999 to 2002 **Vice-President of Engineering, Jackson Energy Authority**, Jackson, TN.
- 1994 to 1999 **Planning Engineer, Jackson Energy Authority** (Jackson Utility Division), Jackson, TN. Responsible for planning for all JEA utilities including Electric, Gas, Water and Wastewater. Also responsible for substation design and coordination with TVA Transmission and Planning.
- 1991 to 1994 **Associate and Head of Electric Utility Department, Allen & Hoshall**, Memphis, TN.
In full charge of all electric utility projects including the design of substations, transmission lines and preparation of long range planning studies, construction work plans, power supply and capacitor application studies, fault current sectionalizing, and reliability studies for rural electric cooperatives and municipal electric systems. Responsible for major military installations and industrial clients.
- 1985 to 1991 **Associate and Director of Automation and Information Systems, Allen & Hoshall**, Memphis, TN. Responsible for evaluation, design and implementation of computer—based systems including Supervisory Control and Data Acquisition, industrial automation systems, engineering design and analysis systems, computer—aided drafting systems and utility billing systems. In addition, directed all Allen & Hoshall computer-based systems including computer—aided design and drafting and management information systems.
- 1979 to 1985 **Associate and Branch Manager, Allen & Hoshall**, Nashville, Tennessee.
Responsible for project management of all aspects of services including planning

and design of electrical utility systems, wastewater collection and treatment facilities, water treatment and distribution facilities, industrial and commercial projects, roadway and airport projects and municipal services.

- 1979 **Superintendent of Engineering and Construction, Electric Department, Jackson Utility Division**, Jackson, TN. Responsible for the supervision of all engineering and line construction personnel and for the design and construction of all transmission, substation and distribution facilities.
- 1976 to 1979 **Project Engineer, Electric Department, Jackson Utility Division**, Jackson, TN. Responsible for system planning, coordinating and utilization of the JUD SCADA system with voltage control application for load management. Preparation of conceptual design of bulk supply facilities and coordination of long range planning with TVA. Duties included acquisition of engineering computer and development of system planning software.
- 1973 to 1976 **Electrical Engineer, Allen & Hoshall**, Memphis, TN. Responsible for preparation of studies for REA and municipal electric systems, including long range plans, construction work plans, sectionalizing studies, REA loan application and evaluation of power supply arrangements and facilities ownership, and design and construction administration of transmission, substation and distribution facilities. Duties also included development of computer software for these functions.
- 1969 to 1972 **Cooperative Education Student, Jackson Utility Division**, Jackson, TN. Participated in surveying, design, staking and construction supervision of transmission, substation and distribution facilities.

EDUCATION

B. S. Electrical Engineering, University of Tennessee, 1973 (Cum Laude)
M. S. Engineering Administration, University of Tennessee, 1983

SOCIETY AFFILIATIONS

Institute of Electrical and Electronic Engineers (Lifetime Senior Member)
National Society of Professional Engineers
Tennessee Society of Professional Engineers

REGISTRATION

Tennessee	#13153	1979	Active
Alabama	#12892	1980	Expired
Kentucky	#11859	1980	Inactive
Arkansas	#7936	1982	Expired
Mississippi	#11632	1982	Expired

CAREER HIGHLIGHTS

Project	Client/Employer	Rating/Location	Comments (Est. Const. Cost)
The 3DUtility, a comprehensive library of 3D blocks of materials and equipment used in the Electric Utility industry.	Self developed		Utilizing plain vanilla AutoCAD/BricsCAD, the system contains over 600 3D blocks along with dozens of applications written in AutoCAD VBA and AutoLisp. For additional information see www.the3dutility.com .
Guide to Transmission & Distribution Standards & Specifications	Tennessee Valley Public Power Association		Original development and first update of two volume standards used throughout the TVA area. I wrote the sections on Line Protection, Relaying, Street Lighting and Engineering Economy. While these documents have been revised several times, these sections remain essentially as I originally authored them.
Oakfield Primary Substation	Jackson, TN, Utility Division (Jackson Energy Authority)	2-90/12/150MVA 161:46:12.47kV	Designed substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including transformers, structures, switches, breakers and pre-fabricated, self-contained relay/control house and prepared construction contract documents (\$2.25M).
34kV Conversion	U. S. Corps of Engineers – Baltimore	Ft. Belvoir, VA	Converted existing 4kV, 12kV, 25kV and 34kV distribution system to 34kV, overhead and underground. Included 6-bay metal clad switchgear to interface to VEPCo (\$4.6M).
Arnold Engineering Development Center	U. S. Air Force	Tullahoma, TN	Developed custom program for fault analysis of 161kV underground transmission system. This study was done to accommodate planned TVA 500kV substation construction and upgrade of their power supply from two to four incoming 161kV lines. The analysis included fault contribution for large motors, the largest being 83,000hp.
SCADA System Design	Port of Seattle, WA	Sea-Tac International Airport	Worked as a subcontractor to HNTB consultants to prepare technical specifications for a 3300+ point SCADA system including electric supply and distribution, water distribution, temperature monitoring for facilities and equipment, alarm status points and miscellaneous monitoring such as noise and CO levels. It also interfaced with the existing baggage handling system, subway transit system and fire alarm system (\$1.5M).

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20 Year Long Range Plan	Jackson, TN, Utility Division		Developed multiple alternatives complete with economic analysis including construction costs and system losses. This plan transitioned JEA from a 46kV sub-transmission system and substations to 161kV substations.
Standardized Construction Contracts and Documents*	Jackson Energy Authority		This is a project I undertook in the past three years to standardize JEA's contracting documents. Prior to this, each utility, Electric, Gas, Water and Wastewater, used their own set of contract documents with differing Standard Conditions, instructions, contracting forms and payment procedures. I developed documents around the EJCDC standards and the CSI format and all technical specifications were reformatted into the CSI format. This significantly reduces our liability/exposure as well as the development and review time to produce a contract. On completion, I developed and presented a half day seminar on contracts, contract writing and contract/ construction administration.
SCADA System Design and Acquisition*	Jackson Utility Division/Jackson Energy Authority		A&H was hired by JUD in the early 1990's to write specifications and assist in the purchase of a SCADA system to replace their original automation system controlling their two 10MGD Water plants and monitoring/controlling their distribution system (tank levels, PRV valves, etc.). Initially, they were focusing on a pc based system. However, I introduced them to the QEI system based on DEC PDP-11 mini-computers. The system finally purchased was a DEC-based system from HSQ Systems. When I returned to JUD as an employee in 1994, a project was under way to replace the aging Tejas/Valmet Electric SCADA system. Based on my knowledge of the HSQ system, I proposed that both systems be combined under HSQ. JUD had reorganized in the mid-1990's and the various operations groups had been combined into a single Operations Department. This fit well in the new organization. Today the HSQ system monitors and controls Electric, Gas, Water and Wastewater in a central dispatch operation.

* Indicates projects completed while employed by JEA/JUD.

PROJECT HISTORY

Project	Client/Employer	Rating/Location	Comments (Est. Const. Cost)
Substation Design and Construction Administration			
Flex Drive Substation	Jackson, TN, Energy Authority	3-18/24/30MVA 161:12kV	Entire design in 3D. Designed the substation general arrangement plan, elevations and grounding plan.
Carriage House Substation*	Jackson, TN, Energy Authority	1-18/24/30MVA 161:12.47kV w/Metal Clad Switchgear	Designed all aspects of the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including power transformer, 161kV breakers, structures and metal clad switchgear (\$1.5m). Was responsible for development of Specifications and Contract Documents and Construction Administration.
West Princeton Substation	Princeton, KY, EPB	2-15/20/25MVA 161:13.2kV	Designed the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including self-contained relay house. Provided contract administration during construction (\$500k).
Madison West Substation Conversion*	Jackson, TN, Energy Authority	2-15/20/25MVA 161:12.47kV	Designed all aspects of the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. I originally designed this substation while with A&H and this was as conversion to 161kV. Specified all equipment (\$1.5m). Was responsible for development of Specifications and Contract Documents and Construction Administration.
Madison West Switching Station*	Jackson, TN, Energy Authority	161kV	Designed all aspects of the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. This project was a 6-bay structure, initially with 3-breakers, designed to TVA specifications for their eventual purchase. Specified all equipment (\$1.5m). Was responsible for development of Specifications and Contract Documents and Construction Administration.
Aberdeen Primary Substation	Warren RECC, Bowling Green, Ky	2-30/40/50MVA 161:69:13.2kV	Designed the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including self-contained relay house. Provided contract administration during construction (\$1.25M). Was responsible for development of Specifications and Contract Documents and Construction Administration.

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Eagle Bend Substation	Clinton, TN, UB	2-18/24/30MVA 161:13kV	Designed the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including self-contained relay house (\$1.5M). Was responsible for development of Specifications and Contract Documents and Construction Administration.
Newport Primary Substation	Newport, TN, UB	161:69:13kV	Major modifications to existing primary substation to accommodate major transformer change out (\$2.4M).
S. Bowling Green Primary Substation	Bowling Green, KY, MU	2-60/80/100MVA 161:69:13.2kV	Designed the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including self-contained relay house. Provided contract administration during construction (\$1.75M). Was responsible for development of Specifications and Contract Documents.
Decatur Primary Substation	Decatur, AL, Utilities	150MVA 161:46:12.47kV	Worked with Mel Henry in a design/package arrangement. Designed substation including structural arrangement, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including self-contained relay house (\$1.75M).
Madison W. Industrial Park Substation	Jackson, TN, Utility Division (Jackson Energy Authority)	2-15/20/25MVA 46:12.47kV	Designed the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including self-contained relay house (\$750k). Was responsible for development of Specifications and Contract Documents and Construction Administration.
Oakfield Primary Substation	Jackson, TN, Utility Division (Jackson Energy Authority)	2-90/12/150MVA 161:46:12.47kV	Designed substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including transformers, structures, switches, breakers and pre-fabricated, self-contained relay/control house and prepared construction contract documents (\$2.25M). Was responsible for development of Specifications and Contract Documents and Construction Administration.
East Park Industrial Substation	Jackson, TN, Utility Division (Jackson Energy Authority)	2-15/20/25MVA 46:12.47kV	Designed the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment (excluding power transformers) including self-contained relay house (\$450k). Was responsible for development of

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			Specifications and Contract Documents and Construction Administration.
Ft. Hood, TX, Base Substation	U. S. Corps of Engineers	2-15/20/25MVA 115:13kV	Designed the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including self-contained relay house.
Misc. Substation Modifications	Jackson Purchase ECC, Paducah, KY	Various	Modifications to substations required for transformer changes, structural upgrades (\$150k).
S. Tullahoma Prim. Substation Rehab	Tullahoma, TN, UB	161:69:13kV	Modifications to accommodate major transformer change out (\$100k).
Kroger Substation	Bowling Green, KY, MU	1-7.5MVA 69:13kV	Designed the substation including grading and fencing plan, physical plan, grounding, relaying and electrical power and controls. Specified all equipment including self-contained relay house. Was responsible for development of Specifications and Contract Documents and Construction Administration.
Union Substation	Jackson, TN, Utility Division	2-10/12.5MVA 46:12.47kV	Responsible for surveying, site design, general arrangement, pad design and decorative fence.
Lexington Street Substation	Jackson, TN, Utility Division	2-15/20/25MVA 46:13kV	As a Cooperative Engineering student, responsible for drafting of single line, three line and wiring diagrams. During construction, responsible for on-site inspection and coordination of construction with contractor.
Transmission/Distribution Design and Construction Administration			
Transmission Line	Clarkesville, TN, ED	2.6mi. 69kV	Project management and design (\$415k).
Transmission Line	Bowling Green, KY, MU	4.0mi. 161kV	Project management and design
Transmission Line	Princeton, KY, EPB	2.0mi. 161kV	Project management and design including surveying.
Misc. Distribution Upgrade and Transmission Line Construction	Cairo, Il, PUC	12 and 69kV	Construction administration and inspection. Included weekly trips to job site to coordinate construction with contractor.
Distribution Line Relocation	Tishomingo County ECC, Iuka, MS	12kV	Line relocations and crossings for TN-Tombigbee Waterway.
Hwy 61 Relocation	Clinton, TN, UB	12kV	Relocated app. 3mi. for highway widening.

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System Planning and Studies			
13kV Overcurrent Coordination Study	U. S. Corps of Engineers	Lexington-Blue Grass Army Depot, KY	Complete coordination study of 13.2kV distribution system including breakers, reclosers and fuses.
REA Construction Work Plan	Clay County RECC, Corning, AR		Prepared standard REA CWP including coordination study.
Long Range Plan	Tishomingo County ECC, Iuka, MS		Prepared LRP to meet REA requirements.
REA Construction Work Plan	Farmers ECC, Newport, AR		Prepared standard REA CWP including coordination study.
REA Construction Work Plan	Tallahatchie Valley EPA, Batesville, MS		Prepared standard REA CWP including coordination study.
Long Range Plan	Elizabethton, TN, ES		Prepared 20 year LRP and 2 year CWP.
Long Range Plan	Princeton, KY, EPB		Prepared 20 year LRP and 2 year CWP.
Long Range Plan	Green River EC, Owensboro, KY		Prepared 20 year LRP and 2 year CWP.
System Study and Mapping	U. S. Corp of Engineers – Nashville	Fort Campbell, KY	Prepared single line map and System Study
System Study and Mapping	Athens, AL, ED		Prepared detailed primary and secondary maps and System Study
SCADA Feasibility Study	Paragould, AR, L&PC		Determined requirements for SCADA system and prepared an economic study.
SCADA Feasibility Study	Dyersburg, TN, ES		Determined requirements for SCADA system and prepared an economic study.
Mobile Spare Transformer Evaluation	Tennessee Valley Public Power Association R&D		This project involved a survey of the 160 TVA distributors to determine the number and makeup of their substation facilities (primary/secondary voltage and MVA) to design a mobile spare transformer program similar to the TVA program. It utilized sophisticated statistical analysis to determine the number and locations of transformers. This was my first use of a database program to analyze the data (in this case, dBasell).

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Economic Conductor Selection	Tennessee Valley Public Power Association R&D		This was the inaugural R&D project for TVPPA.
GIS and System Mapping			
GIS Implementation and Upgrades*	Jackson Energy Authority		I have been involved in the GIS project since returning to JEA in 2004. This initially involved the installation of a GDS based system. It was later upgraded to GE SmallWorld. Currently we are converting the SW system to ESRI.
System Mapping	Tallahatchie Valley EPA, Batesville, MS		Primary system maps.
System Mapping	Jackson, TN, Utility Division		Included primary, secondary, poles, services, meters, etc.
System Mapping	Clinton, TN, UB		Included primary, secondary, poles, services, meters, etc.
System Mapping	Prentiss County EPA, Booneville, MS		Included primary, transformers, poles, services, meters, etc. This project was prepared entirely in AutoCad utilizing custom AutoLisp routines and menus, written by me, to assure consistency and control the layering.
SCADA			
SCADA System Design and Acquisition	West Memphis, AR, UC		
SCADA System Design	Murfreesboro, TN, ED		
SCADA System Design and Acquisition	Paragould, AR, L&W		
SCADA System Design and Acquisition	U. S. Corps of Engineers – Ft. Worth	Fort Hood, TX	

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SCADA System Design	Port of Seattle, WA	Sea-Tac International Airport	Worked as a subcontractor to HNTB consultants to prepare technical specifications for a 3300+ point SCADA system including electric supply and distribution, water distribution, temperature monitoring for facilities and equipment, alarm status points and miscellaneous monitoring such as noise and CO levels. It also interfaced with the existing baggage handling system, subway transit system and fire alarm system (\$1.5M).
Automation & Distribution SCADA System	City of Nashville, TN	Omohundro Water Treatment Plant	Initial modifications to the plant included automated chemical feed and flow proportioning through the plant. SCADA design included replacing existing display board and remote telemetry over leased lines using a tone system with a dual master system utilizing 450 and 940 MHz radio.

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