

Biographical Examples of Relevant Information

Daniel J. Lawrence, PE, QCxP
ELECTRICAL ENGINEER

University of the Pacific (CA): B.S. Electrical Engineering (Magna Cum Laude)

University of the Pacific (CA): Graduate Studies, Electrical Engineering

San Joaquin Delta College (CA): A.A. Electrical Technology (Highest Honors)

IBEW - NJATC Apprenticeship Training Program – Journeyman Inside Wireman

University of Wisconsin, Madison (WI) – Quality Commissioning Provider

Professional Affiliations: Institute of Electrical and Electronics Engineers (IEEE), Air National Guard Civil Engineers Association (ANGCEA), International Brotherhood of Electrical Workers (IBEW), National Fire Protection Association (NFPA)

Honorary Societies: Tau Beta Pi (Tau Beta Sigma), Eta Kappa Nu, Phi Kappa Phi, International Order of the Engineer - Link #130

Registered Professional Engineer (Electrical Practice):

California, Arizona, Colorado, Florida, Idaho, Maryland, Massachusetts, Minnesota, Missouri, Nevada, New Mexico, New York, Oregon, Texas, Utah, Vermont, Virginia, Washington

NCEES National Certificate of Verification No. 9993

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Mr. Lawrence is currently employed by SEG, Inc. as a Senior Electrical Engineer. His primary focus remains solidly in the high risk, high exposure, technology-dependent mission critical and essential systems projects requiring extensive, intensive facility and infrastructure expertise. Projects are engaged to encompass all aspects from the initial programming stages to and through the post-startup commissioning processes. The tasks inclusive run the gamut from initial conceptual studies and document development through engineering and design document preparation and on to the construction administration/management, as well as oversight services.

Prior to repeated engagements of self-employment, Mr. Lawrence was a Principal in the firm of GRG Consulting Engineers, headquartered in Florida, as one of the founding engineers of their first satellite office located in San Jose, CA. His focus, once the office was set up, was to provide electrical engineering and project/program management services to new and former clients in the advanced technology, academic, hospitality, healthcare and entertainment industries.

Prior to the opportunity with GRG, Mr. Lawrence was the Vice President of Engineering Services for Coordinated Projects, Inc., in San Jose, CA. His responsibilities and duties included Principal Electrical Engineer in charge of projects, overall project management and coordination, preparing studies and analyses for facility and infrastructure planning, performing due diligence studies and preparing Basis of Design documentation packages, and developing full electrical engineering and design packages for construction. He was instrumental in providing technical expertise and onsite

supervision for building and systems commissioning projects for both domestic and international clients.

Prior to coming to Coordinated Projects, Inc., Mr. Lawrence was the Principal Electrical Engineer and Engineering Department General Manager for MCM & Associates in Mountain View, CA. His responsibilities included senior level project management of all multidiscipline projects, technical oversight of the department operations, development of standards and procedures for engineering personnel, resource recruiting, responsible engineer in charge of projects, and marketing.

Prior to coming to MCM & Associates, Mr. Lawrence was a Senior Project Manager in the Electrical Department as well as the Chief Electrical Engineer for ALFA TECH Consulting Engineers, San Jose, CA. His responsibilities included senior level project management of large projects, technical oversight of the department operations, development of standards and procedures for engineering personnel, resource recruiting, responsible engineer in charge of projects, assistant discipline manager and electrical marketing.

Prior to coming to ALFA TECH, Mr. Lawrence was the Vice President of Engineering for SASCO Electric, Santa Clara, CA. He was responsible for providing advanced technical leadership excellence to the Northern California and Pacific Northwest operations groups, as well as the corporate level engineering resources required to support the electrical contracting company, through the preparation of proposals, detailed engineering analyses and design documents, reports and studies.

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Prior to coming to SASCO Electric, Mr. Lawrence was the Electrical Discipline Manager in the Tucson, Arizona office of ADP/Marshall (formerly known as Anderson-DeBartolo-Pan). He was responsible for the overall administrative and technical management of the department, as well as Senior Electrical Engineering assignments on world class Advanced Technology projects (primarily semiconductor fabrication facilities and support campuses), both domestic and international. His projects ranged from the \$125M Fab 1 Expansion Project and the \$3.5B Lehi, Utah Fab Complex for Micron Technology, to the \$2.2B Fab IV in Taiwan, R.O.C. and the \$2B US Fab Project in Vancouver, WA for TSMC, to various similar projects for first tier semiconductor manufacturers. His oversight of both the Advanced Technology and the Healthcare Division included providing internal cross-discipline QC/QA, integration of design procedures, resource management, marketing, and corporate interface.

Prior to coming to ADP/Marshall, Mr. Lawrence was employed by Black & Veatch, assigned to the new Digital Equipment Corporation (DEC) Fab 6 semiconductor manufacturing facility in Hudson, Massachusetts. He was an Assistant Project Manager, multidiscipline Team Leader and the Resident Engineer-in-Charge for Phase 1 of the Fab 6 Tool Hook-Up Project. His responsibilities included the oversight of all design engineering issues relative to the installation and facilitization of over \$240M (over 300 tools) of next-generation semiconductor manufacturing equipment and support systems, electrical power and special systems engineering and construction interface and issue resolution.

Before being transferred to

Massachusetts, Mr. Lawrence was a Lead Electrical Engineer and the Electrical Department Manager for the San Jose, California, Facilities Group, Industrial Division, Regional Office of Black & Veatch.

Mr. Lawrence's experience spans the breadth of industrial, commercial, institutional, governmental and residential power, lighting and control systems. He engineers and designs low and medium voltage installations including power system analysis, system coordination studies and code reviews. He is also experienced in design/build contracting, routinely performing detailed cross-discipline design and coordination of electrical and mechanical systems for alarming, control, and hazardous materials dispensing and use.

Representative Project Examples

The following sampling of representative projects, although not all-inclusive, is indicative of the well-rounded electrical engineering and design experience Mr. Lawrence brings to any project.

Tenant Improvement Projects:

Mr. Lawrence has completed numerous tenant improvement projects wherein he designed the lighting, power, and controls systems for multi-use offices and manufacturing facilities. Additional specialized tasks included performing short circuit studies with coordinated device settings, load flow studies, California Title 24 Electrical Energy compliance studies, master plan reviews, value engineering exercises, and code compliance reviews.

DJ LAWRENCE CONSULTING ENGINEER / SEG, Inc. EXPERIENCE

INTEL Corporation Santa Clara; SC4

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Engineering Data Center Expansions: Santa Clara, CA

Mr. Lawrence provided resident engineering and construction management services during the fast tracked implementation of the conversion of approximately 9,000 s.f. of former office space into a combination of ground level and raised floor high density Engineering Data Center space. Responsibilities included peer review of designs, detailed review of contractor and vendor submittal packages, generation of engineer/contractor detailed integration packages, and the development of post-installation commissioning procedures for contractor direction. Unique design directions developed to handle 600+ W/s.f. of high density server-based computing environment, redundancy in M/E/P systems, SCADA-type systems controls integration, 8 MW of 24-hr onsite standby generation, dual 12KV primary feeder infrastructure, and dual 1.5MW isolated redundant UPS power delivery systems, all for support of N+1 capabilities.

VISHAY-SILICONIX - Santa Clara Operations Standby Generation System Expansion; Santa Clara, CA

Mr. Lawrence developed the detailed system conceptual designs and specifications for the renovation and rebuilding of the generator standby system for this leading semiconductor device fabrication facility as well as performed construction management duties during construction, startup and commissioning. Designs included conversion from standalone to parallel generation, with infrastructure to add future capacity in plug-and-play configurations. Included the addition of a second 750KW unit, provisions for a third 750KW unit, new paralleling switchgear integrated with existing distribution switchgear, new fuel

storage, delivery and monitoring systems, integration of a permanent 750KW load bank into the paralleling switchgear, and an Automatic Load Shedding System for interim load management.

GRG CONSULTING ENGINEERS, INC. EXPERIENCE

Sea World Adventure Park: San Diego, CA

Mr. Lawrence provided electrical engineering for all medium voltage and controls integration projects for the Sea World Adventure Park 12KV and 5KV system renovation and upgrade projects, including the Co-Generation Conversion Project which converted four co-generators totaling 2,660 KW from automatic cogeneration functions to manual standby generation functions.

Univ. of Texas, MD Anderson Cancer Research Center; Houston, TX

Mr. Lawrence provided the industry expertise to develop the programming and basis of design documents to introduce a new, heretofore unplanned, \$11M, 12,000 s.f. corporate data center into a new building in the newly designed and under construction complex. His extensive experience handling projects of this nature that present the myriad of challenges existing in such unique installations enabled him to bring many innovative solutions to the project. The data center, after evolving from a computer room to a Tier IV high-availability data center finally settled on an interim Tier II solution due to Master Planning evolutionary decisions by the University. Completion is scheduled for FY-2004.

COORDINATED PROJECTS, INC.

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EXPERIENCE

Terraspring - Hotchkiss Datacenter: Fremont, CA

Mr. Lawrence was the Electrical Engineer-in-Charge and assistant Project Management consultant for this 35,000 square foot, \$65M, Class A, extremely high-end Internet Datacenter project. The uniqueness of his designs led to the accommodation of a 300+ watts per square foot demand load, extremely high availability of conditioned power ("N+1", ~Sigma 6). His designs resulted in practically no remaining single points or paths of failure, redundant distribution philosophies from the source equipment to the server rack bay receptacles, and high security and support features found only in the highest threat and exposure environments. Special features included the provision for two (2) independent 20.8 KV incoming services to serve the 11 MW nominal design loads, the utilization of Continuous Power System units for the conditioned power generation and distribution system at 20.8 KV, subcycle solid-state, multiple source static transfer switches to distribute the power to the server rack bays, a novel use of a three (3)-bus distribution philosophy for redundancy throughout, and the potential for deploying auxiliary gas turbine plants onsite to backup the total plant infrastructure in the event of power failures.

MCM & ASSOCIATES EXPERIENCE

Digex, Inc./ICI West Coast Internet Data Center; San Jose, CA

Mr. Lawrence is the overall multidisciplined architectural and engineering design team project manager and principal electrical engineer for a \$30M, 67,500 sq. ft.,

mission critical, Class A Internet Data Center. Important design features include "N+1" redundancy for electrical and mechanical systems by capacity and equipment, UL 1558 100% rated switchgear, a new 20.8KV primary service entrance, 3,000KVA of parallel redundant static UPS, 2,800 tons of chilled water cooling, FM-200 and dry-pipe pre-action fire suppression systems, a Very Early Warning Smoke Detection system in the mission critical areas, multiple level protocol proximity and biometric based physical security systems, and fully integrated life safety systems.

ALFA TECH CONSULTING ENGINEERS EXPERIENCE

Microsoft Silicon Valley Campus; Mountain View, CA

Mr. Lawrence was the Senior Electrical Engineer and Assistant Project Manager for the \$65M, 515,000 sq. ft. 5-building campus consolidating the WebTV, Hotmail and Microsoft efforts in the south Bay Area. The project required the development of numerous conceptual designs, overall Site Primary-metered Power scenarios, building electrical systems, extensive cost-benefit and risk analyses, document preparation and issuance.

SUN Microsystems Worldwide Operations (WWOPS) Mfg Facility; Newark, CA

Mr. Lawrence was the Senior Electrical Engineer in responsible charge of the SUN Microsystems WWOPS campus in Newark, CA. Along with over 220,000 sq. ft. of core and shell manufacturing facility, the designs included an 84,000 sq. ft. R&D office building, 52 acres of site development planning, the fitup of the lab spaces inside the buildings, and the site primary voltage electrical

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services to provide power for another 50 acres in the future.

SASCO ELECTRIC EXPERIENCE

AT&T Wireless Campus: Redmond, WA

Mr. Lawrence was the Senior Project Electrical Engineer-of-Record for the 4-building Phase 1 design-build project implementation of the new greenfield campus comprising over 700,000 square feet of office space, over 400,000 square feet of multilevel parking garages, primary voltage distribution systems, individual standby generation and backup distribution systems in each building, integrated building management and reporting systems, and state-of-the-art fiber optic and wireless (satellite, microwave) communications platform distribution networks. His responsibilities included the completion of drawings, specifications, calculations, short circuit and device coordination studies, Washington State Energy Compliance calculations, and weekly design meetings onsite.

Skyport Business Complex: San Jose, CA

Mr. Lawrence was the Senior Project Electrical Engineer-of-Record for this design-build project consisting of two identical buildings totaling 375,000 square feet of Class "A" multi-story office space and 450,000 square feet of multilevel parking garage. The greenfield site was developed with primary voltage power service, complete interconnection of underground and floor-to-floor fiber optic and hardware telecommunications and data networks, standby power generation, fully-qualified life safety systems, and a separate 200 Ton, 24/7 stand-alone cooling system on each building in preparation for data

centers in each building for future tenant improvement work. His responsibilities included concept development, value engineering analyses, design option development, construction document preparation, and local authority coordination with building, electrical, fire and Hazmat divisions.

ADP/MARSHALL EXPERIENCE

Micron Technology, Inc.: Boise, ID

Mr. Lawrence was the Senior lead Electrical Engineer for the Fab 1 Expansion Project at Micron's Boise manufacturing complex. He had lead design responsibilities for the 25,000 sq. Ft. Class 10 cleanroom and support facility comprising some 110,000 gross sq. ft. of expanded manufacturing capability. He was the signature authority for the power, lighting, and special systems designs for the project, as well as the author of the specifications and the design professional of record.

Micron Technology, Inc.: Lehi, UT

Mr. Lawrence was the Senior Project Electrical Engineer-of-Record for the Fab 5 and Fab 6 Projects in Lehi, UT that is composed of over 4 million sq. ft. of space, with two fabrication buildings that have over 160,000 sq. ft under filter in Class 10 or better spaces. These are greenfield sites that include new Central Utility Plant, Test, Assembly, Chemical Distribution and Shipping and Receiving facilities as well as new office spaces. His oversight included drawings, specifications, calculations and sealing the documents for permitting and construction.

Taiwan Semiconductor Mfg Co., Ltd.:

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Hsinchu City, Taiwan, R.O.C.

Mr. Lawrence was the Lead Electrical Engineer for the Phase II, Fab IV Fit-up Project of the 900,000 sq. ft. semiconductor manufacturing foundry facility in Hsinchu City, Taiwan, R.O.C. His responsibilities included the design oversight of the power, lighting, special grounding, fire alarm, hazardous gas and chemical detection systems, security, voice and evacuation paging, telecommunications, data communications and FMCS implementations. Mr. Lawrence supervised the project electrical team in both the Tucson, AZ and Greenville, SC offices.

BLACK & VEATCH EXPERIENCE

Onizuka Air Force Base;

Sunnyvale, CA

Mr. Lawrence was the Lead Electrical Engineer for several projects including: (1) the replacement of underground fuel storage tanks and fuel transfer equipment for the central power plant, and, (2) the replacement and upgrade of the energy monitoring and control systems (EMCS) for all of the existing buildings. The fuel tank replacement involved extensive hazardous electrical equipment installation and instrumentation coordination. The EMCS replacement and upgrade required complete system characterization, interfacing with existing EMCS equipment, and the selection, design and installation of over 2400 points of new system control and monitoring.

San Jose/Santa Clara Water Pollution Control Facility;

San Jose, CA

Mr. Lawrence was the Lead Electrical Engineer for the new 38,500 s.f. Technical Services Building housing laboratory and office areas to support

the San Jose Water Pollution Control Wastewater Treatment Plant. He was responsible for the overall electrical team design engineering tasks including: (1) incoming 4.16kV metal-clad switchgear modifications; (2) 4.16kV underground distribution and new unit substation designs; (3) building electrical power, lighting and telecommunications systems; (4) the integrated energy management and control systems; (5) short circuit and system protection analysis; and (6) the electrical energy compliance analysis.

INTEL Corporation, SC1 & SC2;

Santa Clara, CA

Mr. Lawrence engineered and designed the complete installation of a new 12kV, 1500kVA unit substation, including the short-circuit and load transfer analyses, prepurchased, long-lead equipment specifications, and the construction specifications and drawings

Varian Associates;

Palo Alto, CA

Mr. Lawrence performed device coordination studies establishing breaker, relay and fuse settings and coordination curves for current and proposed system configurations to coordinate with the serving utility.

GREENE ENGINEERS EXPERIENCE

Univ of California, Los Angeles;

SEAS Hazardous Gas Storage Facility;

Los Angeles, CA

Mr. Lawrence designed the power, lighting, toxic gas alarms and the fire alarm system interfaces for the Toxic Gas Storage Facility supporting the newly constructed R&D labs and cleanrooms for the graduate and post-graduate instruction and research programs.

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Celtrix Laboratories, Inc.: **Santa Clara, CA**

Mr. Lawrence performed lead electrical engineering tasks to design the power, lighting, fire alarm and emergency power distribution systems for the new 70,000 sq. ft. pharmaceutical and biotechnology pilot plant empty shell tenant improvement project. The project included a new 4000 amp service, a new 2500kVA substation and a new 300kW diesel emergency generator package. Mr. Lawrence developed the pre-purchase and construction specifications packages, the Title 24 electrical energy compliance analysis and the short circuit analysis for preliminary settings and long-lead, prepurchased equipment.

Digital Equipment Corporation: **Sunnyvale, CA**

Mr. Lawrence completed design documents and specifications for the renovation/ remodel of a 43,500 sq. ft. computer equipment repair center and support offices. His tasks included power, lighting and life safety system reviews and repairs as well as the State of California Title 24 electrical energy compliance analysis for the complete building. This included new distribution designs for test areas, roof-top A/C units, burn-in-stands, and new busduct distribution for the repair areas.

Akashic Substrates, Inc.: **Milpitas, CA**

Mr. Lawrence designed the power distribution and PLC-based control systems for process control of a heavy metals recovery, acid waste neutralization and waste treatment system upgrade. He utilized the microprocessor-based schemes for efficient monitoring, control and trend logging of the process for management documentation.

UNIVERSITY OF CALIFORNIA/DEPT OF **ENERGY, LAWRENCE LIVERMORE** **NATIONAL LABORATORY EXPERIENCE**

DOE - Lawrence Livermore National **Laboratory (LLNL):** **Livermore, CA**

Mr. Lawrence was the Lead Electrical Engineer for the \$140M electrical utility system upgrade program at the nuclear weapons and high-energy physics research complex. Initial projects included: electrical code violation corrections; utility system grounding upgrades; 4.16kV, 12kV and 13.8kV underground and overhead system conversions; 200MVA, 115kV substation intertie between federal and private utilities; 100MVA/13.8kV power transformer and substation switchgear replacement including conventional facilities and SCADA implementation; development of construction specifications and purchase documents; inspection, location and siting of seven common aisle, 13.8kV, double-ended, metal clad, outdoor load-grid switchgear area substations; and electrical utility system master plan reviews.

Mr. Lawrence served as the field electrical engineer for the \$48.5M High Explosives Applications Facility (HEAF) - Bldg 191 project on a multi-disciplined, dedicated project staff. He provided submittal reviews and approvals, special systems analysis and design, and A/E coordination. Mr. Lawrence designed the emergency generator installation and the emergency and normal power distribution systems for the computer facility within the building, including the Signal Reference Grid (SRG) grounding system. He also engineered and designed the conductor and cable routing outside of the facility for the 13.8kV primary power as well as the classified and unclassified hardwire and fiber optic communications cable

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systems. His controls systems designs included the building EMCS, the toxic and flammable gas panels and system purge controls and the fume hood airflow control systems.

Other projects for LLNL included the complete short-circuit and coordination study for the Northwest LCW Cooling Water Station, numerous emergency generator installations and various internal renovation and remodel projects.

Electrical Contracting Experience

Prior to joining the private and public consulting engineering community, Mr. Lawrence gained over 20 years of extensive electrical design, engineering, construction installation and contracting experience in a wide variety of areas.

As a journeyman electrician in a family-owned electrical contracting business, he supervised work crews, ordered materials, serviced clients as a troubleshooter on 24-hour call and trained apprentices coming into the trade.

For other electrical contractors, Mr. Lawrence was a journeyman inside wireman, foreman and shop superintendent. Projects included shopping centers, K-12 schools, universities, industrial manufacturing firms, public works projects, food processing plants, high-rise office buildings and various commercial/industrial and related agricultural projects.

San Joaquin Delta College: Stockton, CA

From 1980 to 1991, Mr. Lawrence was an evening instructor at San Joaquin Delta College, Stockton, CA, teaching in the NJATC-IBEW Inside Wireman

Electrical Apprenticeship Program. He has taught all classes from first through fourth year. Additional classes taught included lower division core engineering classes.

MILITARY EXPERIENCE

US AIR FORCE/Air National Guard

Mr. Lawrence held a reserve commission in the United States Air Force with the permanent rank of Major. He recently served in the California Air National Guard with the 129th Rescue Wing, 129th Civil Engineer Squadron (Prime BEEF), at Moffett Federal Airfield, Sunnyvale, CA. Major Lawrence was the Operations Officer for this worldwide mobile, base contingency operations, combat engineering military construction team that accomplished military and humanitarian service projects worldwide. Previously, he served for three years as the Force Management and Prime BEEF Officer for the 102nd Civil Engineer Squadron, Otis ANG Base, MA, and the Operations Officer for five years and the Engineering Officer for one year for the 129th Air Rescue Group, 129th Civil Engineer Squadron (Prime BEEF), NAS Moffett Field, CA.

As an integral part of the military engineering force, Major Lawrence has been the project manager for several large domestic and foreign projects during his tours of duty. In 1998, Major Lawrence planned and executed a deployment of 51 troops to Aviano AB, Italy to provide the USAF Total Force mission assistance to the active USAF efforts in support of the ongoing peacekeeping missions in the Bosnia, Herzegovina, Turkey and Middle Eastern block arenas.

In 1992, Major Lawrence executed a

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deployment of 39 troops to La Paz, Bolivia, SA. The projects were humanitarian service related, nation-building projects engaged in the remodeling and upgrade of public health service hospitals and clinics. This deployment required a 10-day pre-deployment for site surveying and engineering as well as a two week main deployment. Such adversarial issues as extremes of altitude, local diseases, civic unrest and terrorism activities surrounding the US-led Drug Interdiction Program were endemic to the deployment.

In 1988, Major Lawrence was one of two officer project managers deployed to Palmerola AB, Honduras, CA, with a 50-person team to continue the work of establishing the JTF-BRAVO compound in concert with the Honduran Air Force and various American military forces. His construction expertise was put to good use as the site had no effectively intelligible drawings or designs from which to work. This deployment was an excellent example of utilizing field expedient methods and improvisation to successfully complete the mission objectives.

During the years 1989-1992, Major Lawrence was utilized heavily during the 129th Air Rescue Group conversion from the HH-3E "Jolly Green Giant" rescue helicopter to the MH-60G "Pave Hawk" rescue helicopter. Many different and varied projects were required to effect a smooth conversion of the support function facilities and hangar spaces at NAS Moffett Field to accommodate the new aircraft and associated support and logistics functions.

From 1987 to 1993, and again from 1996 thru 2000, Major Lawrence was the 129th Rescue Wing Ceremonial

Adjutant, officiating at most Awards and Change-of-Command Ceremonies.

Major Lawrence regularly conducted training classes for the troops within the Civil Engineering Squadron and base-wide as a measure of Continuing Process Improvement.

Major Lawrence is now retired from participation.