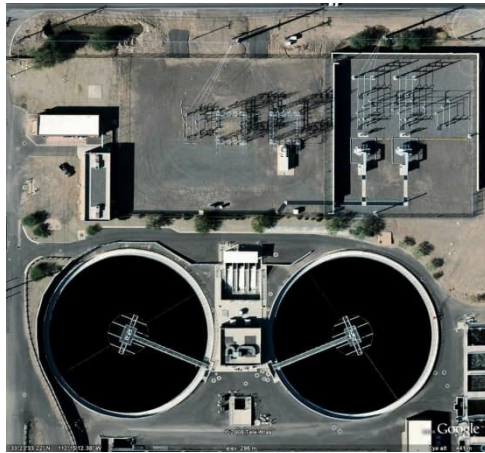
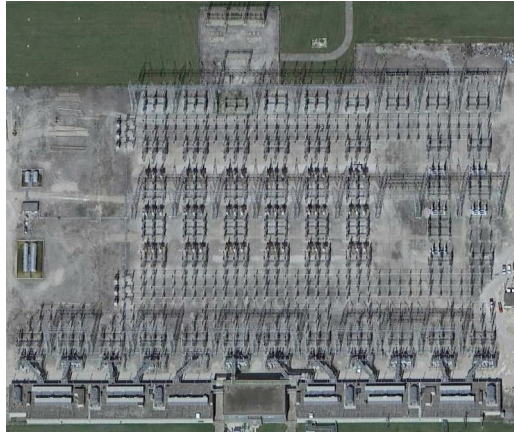




HARDWICK ENGINEERING LLC

ENGINEERING SERVICES



STATEMENT OF QUALIFICATIONS

SUBMITTED BY: ERIC HARDWICK, P.E.



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Firm Overview

Hardwick Engineering, LLC is a self-certified small business and started as Hardwick Engineering in April of 2007 in Phoenix, Arizona as an electrical design firm. Hardwick Engineering, LLC now provides civil, electrical, mechanical, and plumbing engineering professional services in Arizona, multiple additional states and Canada, servicing commercial, industrial, and governmental clients.

Hardwick Engineering's primary focuses are electrical consulting and design projects where architectural, civil, mechanical, plumbing, and structural services are secondary.

Full service architectural and engineering (A&E) services are provided through sub-consulting with architectural, fire protection, structural, process engineers, and programming experts selected based on the project specific needs.

Electrical Design

Hardwick Engineering's electrical division is lead by Eric Hardwick providing consulting and design services in low ($\leq 1000V$), medium ($>1KV-69KV$), and high ($115KV-230KV$) voltage power distribution systems, protective device coordination studies, arc flash analysis, instrumentation and control systems, SCADA systems, renewable energy systems, and building systems.

We utilize our expertise in the National Electrical Safety Code (NESC), National Electrical Code (NEC), Electrical Safety in the Work Place (NFPA 70E and OSHA 1910 Subpart S), Lockout/Tagout, and Job Safety Hazard Analysis to consult and design projects in a safe and thorough manner.

Our experience in power system and arc flash software includes ETAP, SKM, and Arc Pro which have been utilized for Clients including small private companies, large corporations, and federal projects where the requirements of NFPA 70E have been adopted and/or enforced though the requirements of OSHA 1910 Subpart S.

Building electrical system designs include new and existing buildings for offices, controls rooms, trailers, equipment rooms, churches, and institutional covering electrical and special systems such as fire alarm and communications.

Industrial electrical system designs include power, instrumentation, and control systems for water treatment plants, pump stations, well sites, lift stations, mining operations and industrial/manufacturing plants.

Our renewable energy design experience include grid tied and off-grid energy production systems from small commercial and residential to large utility scale systems.



Electrical Design (Continued)

Specialties include nuclear remediation facilities and projects with hazard area classified areas such as facilities utilizing hydrogen and other various explosive and/or flammable gases, fumes, vapors, and dust environments.

Mechanical Design

Hardwick Engineering's mechanical division provides consulting and design services in HVAC and plumbing systems for new and existing buildings including office complexes, controls rooms, equipment rooms, churches, institutional, and manufacturing facilities.

Civil Design

Hardwick Engineering's civil division provides consulting and design services in grading and drainage, water/wastewater systems, hydrology, retaining walls, and numerous other types of projects.

Structural Design

Hardwick Engineering, LLC works with several structural engineering firms to provide and manage structural engineering services on commercial, industrial, and mining projects.

Architectural Design

Hardwick Engineering, LLC works with several Architectural firms to provide and manage architectural services on commercial, industrial, and mining projects.



Commercial Projects

Hardwick Engineering has numerous architectural Clients providing Tenant Improvement (TI) and ground-up designs for projects including various commercial complexes, retail, office buildings, restaurants, churches, and custom homes.

Industrial Projects

Hardwick Engineering has provided numerous designs for industrial projects providing power, I&C, and RTU designs in addition to power system studies and arc flash analysis for heavy industrial, light industrial, mining and water/wastewater plants.

Governmental/Federal/Nuclear Projects

Hardwick Engineering has supported directly and indirectly major national engineering firms including AECOM, Ch2MHill (now Jacobs), Fluor-B&W Portsmouth, Malcolm Pirnie, Stantec, and Washington Group (now AECOM) on multi-billion-dollar projects.

- DOE Portsmouth Gaseous Diffusion Plant, Piketon, OH, Decontamination & Decommissioning project, provided design of various high, medium, and low voltage projects for Fluor B&W construction, maintenance, and operations groups.
- DOE Hanford Tank Farm, Hanford, WA, providing consulting and design for various power and instrumentation and control projects supporting WRPS.
- DOE Hanford Ground Retrieval Waste Cleanup Project, Hanford, WA, providing consulting and design for various power and I&C projects supporting E2 Consulting and CHPRC.
- DOE Idaho National Laboratory, Idaho Falls, ID, Decontamination & Decommissioning project, providing design of various projects for CWI.

Renwable/Green Projects

Hardwick Engineering has designed numerous commercial photovoltaic systems typically below 200KW for municipalities and private clients. Additional information provided upon request.

Hardwick Engineering has designed numerous projects involving hydrogen, hydro dams, battery storage systems, EV charging stations, etc. for municipalities and private clients. Additional information provided upon request.



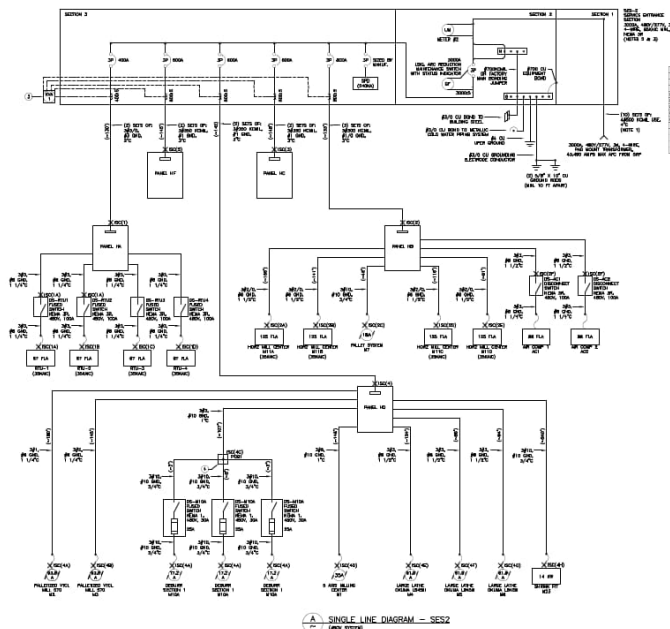
Projects Highlights, and References

Client: FM Industries, Danial Kohn,
(602) 397-1168

Project: FM Industries Broadway Facility
TI Project

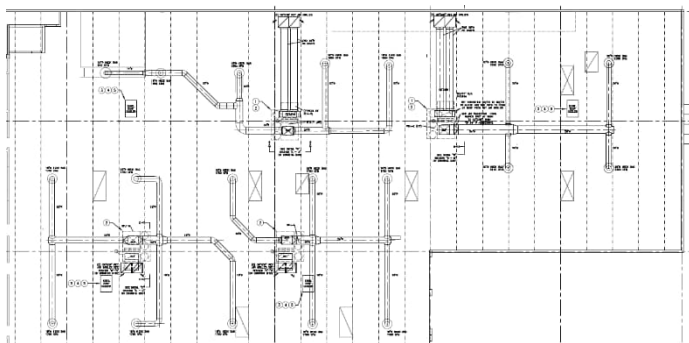
Project Scope:

Upgrade electrical and HVAC system for ~20Kft² warehouse conversion to machining operations, requiring roof mounted evaporative coolers replaced with roof mounted air conditioning units.



Major Project Actives:

- Provided architectural, electrical, HVAC, and structural design
- Designed new 480V distribution system.
- Designed HVAC system upgrade for production area.
- Designed structural support upgrades for larger rooftop units.
- Performed bid evaluations.
- Managed drawing permit submittal cycle.





Client: Strategic Industrial Properties,
Daryl Mechem, (303) 345-1367

Project: K1 Racing Phoenix Location TI

Project Scope:

Convert ~80Kft² office/warehouse industrial occupancy to commercial occupancy use requiring architectural interior changes, planning and development site plan variances, electrical, HVAC, and plumbing systems upgrades. Roof mounted HVAC units replaced with combination of evaporative coolers and heat pump units.

Major Project Actives:

- Implemented/managed City of Phoenix Ordinance variance for parking lot parking space reduction.
- Architectural, electrical, and HVAC designs.
- Designed new 480V distribution system.
- Designed HVAC system upgrade for assembly area.
- Coordinated requirements for design of structural support upgrades for both replacement and new rooftop units.



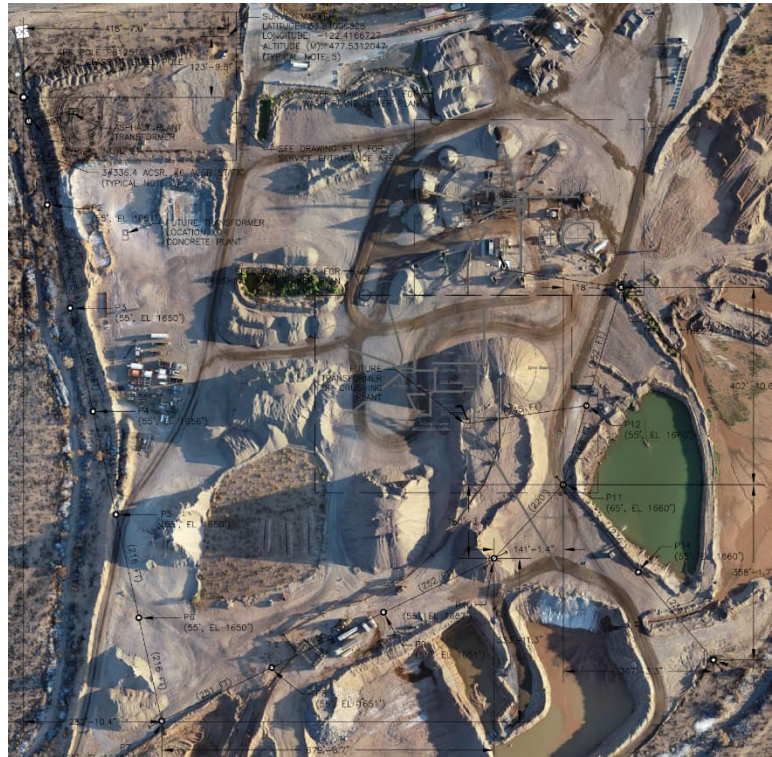


Client: Private

Project: Sand & Gravel Mining
Plant New 12.47KV
Electrical Service

Major Project Actives:

- Designed primary service and 12.47KV overhead distribution system previously powered from generators.
- Designed 480V distribution system.
- Performed protective device coordination study and arc flash analysis
- Design water control system.
- Performed bid services.
- Construction oversight.





Client: AECOM, Government Services, Richard Tringale, (865) 604-4059

Project Owner: DOE Portsmouth Gaseous Diffusion Plant

Project Prime Contractor: Fluor B&W Portsmouth

Project Scope & Actives:

Hardwick Engineering was awarded a 6-month contract to provide Arc Flash Subject Matter Expert support to assist in development of a new arc flash program as well as provide arc flash analysis.

Hardwick Engineering performed the technical review of the 345KV, 2100MVA switchyard/substation and 13.8KV distribution system utilizing NFPA 70E and NESC criteria as well as performing DC system arc flash analyses for the extensive 250V & 125V DC control systems. Other major projects Hardwick Engineering has provided technical support for includes a) technical reviews and construction support for a new 13.8KV overhead distribution system, b) new X-550 100MVA substation design, and c) troubleshooting existing switchyard/substation failures.



Hardwick Engineering was awarded an additional 2 contracts (24 months) for NERC compliance support and design implementation and other various project support including respirator and laundry relocations, lighting improvements, trailer installations, building heating system installations and equipment installations for support of decontamination and decommissioning efforts for the next 20-30 years.



Client: E2 Consulting Engineers, Charles Tyler, Manager, (208) 206-9951

Project Owner: DOE Hanford Site

Project Prime Contractor: Washington River Protection Solutions (WRPS)



Project Scope & Actives:
Hardwick Engineering was awarded a 12 month contract to provide consulting and design support for the Hanford Tank Farm Facilities.



Major projects included:

A) Leak detection system replacement projection where Hardwick Engineering provided the design and testing requirements for replacement of an obsolete leak detection system used throughout the tank farms.

B) Sluice retrieval project providing electrical and I&C designs for the waste retrieval from various C Farm tanks.

C) Consulting for safety significant thermocouple monitor system for underground waste storage tanks. Hardwick Engineering provided the E&IC requirements, conceptual design, bill of materials, and E&IC cost estimate as the basis for conversion of a non-safety thermocouple to a DOE requested safety significant thermocouple.

D) Hardwick Engineering provided the electrical design for temporary power to the AY/AZ tank farms to allow for installation of the AY/AZ tank farm switchgear upgrades.

E) Hardwick Engineering provided the electrical & IC gap analysis of existing Cold Test Facility renovations to allow for submerged pump testing.





Client: E2 Consulting Engineers, Charles Tyler, Manager, (208) 206-9951

Project Owner: DOE Hanford Site

Project Prime Contractor: Ch2MHill Plateau Remediation Cleanup (CHPRC)



Project Scope & Actives: Hardwick Engineering was awarded a 9 month contract to provide consulting, design and construction support for CHPRC's Ground Retrieval Project.



Major project activities included:

A) Hardwick Engineering provided design support and construction oversight of AG-1 Portable HEPA Exhauster System. Hardwick Engineering developed the schematic diagrams, FAT for the exhauster and the CAT incorporating testing and turnover requirements for both the AG-1 Portable HEPA Exhauster and Portable Kelley Closure building per ASME AG-1 (Code on Nuclear Air and Gas Treatment) requirements.

B) Hardwick Engineering provided the electrical



infrastructure design at the 3A, 4B, and 4C burial sites for the NGR-TRU Waste Retrieval Project as well as providing construction oversight and developing testing requirements.



Client: URS EG&G Technical Services, Lynn Wickham, (208) 317-1333

Project Reference: DOE Idaho National Laboratory Site

Project Prime Contractor: CH2MILL-Washington Inc (CWI)



specifications for the relocation of the INL Site telecommunications room to a new concrete building.

D) Designed a new tower mounted security camera system.

E) Hardwick Engineering developed CWI's DC arc flash analysis process.

Project Scope & Actives:

Hardwick Engineering was awarded a 12 month contract to provide consulting and design support for the Idaho National Laboratory Decontamination and Decommissioning Project.

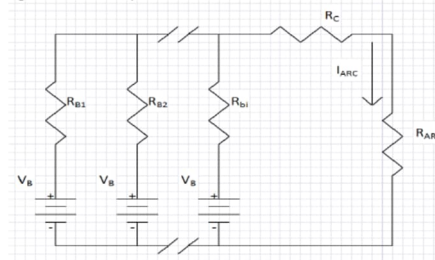
Major projects and activities included:

A) Design modifications to INL facility AG-1 HEPA Exhaust System Controls.

B) Designed temporary power systems for the isolation and demolition of numerous buildings.

C) Hardwick Engineering provided electrical design and construction

Figure 1. dc schematic equivalent with dc fault and arc calculations.



$$I_{BF} = (V_B) / (R_{B1} || R_{B2} \dots || R_{Bi} + R_C) \quad (1)$$

where

- I_{BF} = Bolted Fault Current in amps (A)
- V_B = Battery Voltage in volts (V)
- R_B = Battery Resistance in milli-ohms (mΩ)
- R_C = Cable Resistance in milli-ohms (mΩ)

$$I_{ARC} = (V_B) / (R_B || R_B + R_C + R_{ARC}) \quad (2)$$

where

- I_{ARC} = Arcing Fault current in amps (A)
- R_{ARC} = Arc Resistance in milli-ohms (mΩ)

$$R_{ARC} = [20 + 0.534 (Z_G)] / [(I_{ARC})^{0.8}] \quad (3)$$

where Z_G = Air Gap in millimeters (mm)

Guidance regarding air gap values may be obtained from NFPA 70E - 2009 by referring to Table D.7.2, "Factors for Equipment and Voltage Classes."

Substitute equation 3 into equation 2 and iteratively solve for I_{ARC} & R_{ARC} until convergence.



Partial Project List

Federal/Nuclear

DOE Portsmouth Gaseous Diffusion Plant, Decontamination & Decommissioning, AECOM and FBP, Piketon, OH
DOE Hanford Tank Farm Consulting and Design Support, E2 Consulting and WRPS, Hanford, WA
DOE Hanford Ground Retrieval Waste Cleanup Project, E2 Consulting and CHPRC, Hanford, WA
DOE Idaho National Laboratory, Decontamination & Decommissioning, EG&G and CWI, Idaho Falls, ID

Industrial

Gila River San Tan Mountain Casino Waste Water Treatment Plant
Gila River San Tan Mountain Casino Lift Station
Various Subdivision Development Lift Stations
Various Well and Reservoir Tank Sites, and Booster Pumping Stations
Young's Market Beverage Distribution Facility, Welch Electric
JBS Packerland Chiller and Pump Station Projects, Watkins Electric
Client Confidential: Leach Dump Pump Station, Copper State Engineering
Highland Pines Domestic Water Improvement District Pump Station SCADA System
Crisantes Tubac Well and Pump Control Controls, Kimley Horn & Associates
America West Quarter Horse Ranch Disinfection System Upgrade, Fluid Systems
FICO Pump and Tank Site Design Services, Kimley-Horn Associates
Sahuarita Water Booster Station Design, Kimley-Horn Associates
La Paz County Centennial Park Pump Station Improvements, Brooks Engineering
Diesel Storage Tank Controls Design, F5 Equipment

Power Systems

Portsmouth Gaseous Diffusion Plant, AC and DC Arc Flash Analysis, AECOM and Fluor B&W
Young's Market Beverage Distribution Facility Arc Flash Analysis, Welch Electric
PNNL Battelle Self Contained Laboratory Arc Flash Analysis, Northpoint Electric
DOE Hanford AY & AZ Tank Farm Temporary Power System Design and Power System Analysis, WRPS
Pureheart Christian Coordination & Arc Flash Analysis, Pureheart Christian Church
City of Phoenix 69/4.196 KV Transformer Relay Coordination Study, MET Electrical/Malcolm Pirnie
City of Henderson (NV) Waste Reclamation Phase 2 Expansion Coordination Study, MET Electrical
DOE Idaho National Laboratory, AC & DC Arc Flash Analysis, EG&G/URS, CWI

Photovoltaic Systems

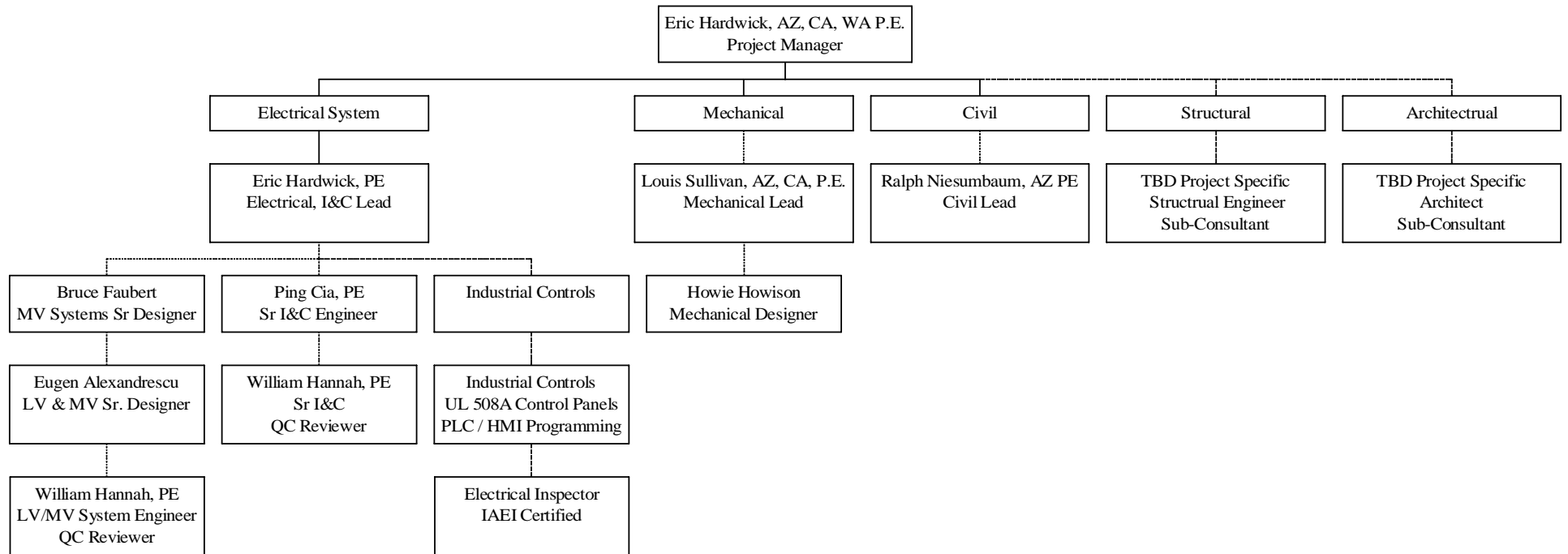
Available upon request.

Company Resources

Hardwick Engineering's staffing resources include senior level experienced engineers and designers. Team members are available "On Call" as temporary support when required. Below is as sample project organization chart with additional resources available as needed.



Hardwick Engineering, LLC
 FM Industry Riverpoint Parkway Renovation
 Project Organizational Chart



(Large dashed lines indicate Sub-Consultant, Small dashed lines indicate 1099 Resource)



A summary of qualifications for some select Hardwick Engineering team members is as follows:

Eric Hardwick, P.E. is the owner and principal of Hardwick Engineering with over 30 years of experience including design work for DOE Nuclear facility projects, heavy industrial manufacturing including glass and metals production, water/wastewater systems, commercial building electrical systems, emergency system, photovoltaic systems, power system analysis, and arc flash analysis. Mr. Hardwick is currently licensed in Arizona, California, and Washington. Mr. Hardwick is the primary point of contact for Hardwick Engineering, LLC projects.

Mr. William (Ned) Hannah, P.E. is a professionally licensed electrical engineer in Arizona with over 20 years of extensive experience in the electric utility industry and an additional 30 years in providing consulting design service for industrial, mining, municipal, and architectural projects. Ned provides support for design activities of power, instrumentation, and control systems, construction observations, field instrumentation configurations, equipment data collection, and other field support activities as need.

Mr. Bruce Faubert has a BSEE with over 40 years of electrical design, operations, and maintenance support experience in utility and industrial facilities. Bruce provides design and support activities for power, I&C, construction observations, field instrumentation configurations, equipment data collection, and other field support activities as need.



Electrical Services Offered

Design Services for Commercial Projects

- Electrical Site Plans
- Electrical Single Line Diagrams
- Power Plans
- Lighting Plans
- Photometric Plans
- Grounding Plans
- Communication Plans
- Fire Alarm Plans
- Security Plans
- Emergency Systems
- Photovoltaic Systems
- Schematic Diagrams
- Connection/Wiring Diagrams

Design Services for Industrial / Manufacturing Facilities

- MV & HV Substations and Switchyards
- Power Distribution Systems
- Standby and Emergency Systems
- Hazardous Classified Area Evaluations
- P&IDs
- Loop Diagrams
- SCADA Systems
- Instrumentation and Control Systems
- Material Handling Control Systems
- Machine Automation Systems
- Communications Systems
- Security Systems
- Control Panel Design

Design Services for Nuclear Industry

- Class 1E Power and Raceway Systems
- Safety System Equipment Spec's
- Commercial Grade Dedication
- DOE nuclear standards
- Safety Analysis

Design Services for Water / Waste Water

- Power systems
- Instrumentation and Controls
- SCADA systems
- Water Treatment Facilities
- Waste Water Facilities
- Pump Station Power & Controls
- Well Sites Controls
- Reservoirs Controls
- Lift Stations
- Valve Vaults
- Pressure Reducing Vaults

Consulting Services

- Energy Analysis and Audits
- Power System Studies
- AC & DC System Arc Flash Analysis
- NEC Code Analysis
- Hazard Analysis
- Hazardous Area Classification
- Design Review
- NERC Compliance
- QC/QA Review
- Cost Estimates
- Bid Evaluations
- Value Engineering
- Patent Research
- Product Reviews
- Training

Construction / Integration Services

- Construction Project Management
- Special Inspections
- Submittal Reviews
- Field Observations
- PLC Programming
- HMI Programming