### Lawrence Charles Hale

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## **EDUCATION**

Stanford University - B.S., Electrical Engineering;

Stanford University - M.S., Environmental Engineering;

University of Idaho, Graduate Electrical Classes: Electric Machinery Fundamentals, Power Systems Analysis, Control Systems Analysis, Applied Protective Relaying, Power Electronics.

#### PROFESSIONAL REGISTRATIONS

Professional Electrical Engineer, Alaska, No. EE-7469

Professional Electrical Engineer, California, No. E 16820 (inactive status)

Professional Electrical Engineer, New York, No. 079679 (inactive status)

Professional Electrical Engineer, Washington, No. 0025488 (inactive status)

Professional Civil Engineer, Alaska, No. CE-4996 (inactive status)

Registered with NCEES for obtaining PE registration in any state.

#### TECHNICAL SOCIETIES

IEEE (Senior Life Member), PCIC, NFPA, ISA. For the Alaska Section of IEEE, was Chairman, Vice Chairman, Secretary and Education Chair. Was on the steering committee for the National Engineer’s Week for Alaska.

#### AWARDS

In 2000, was awarded the Third Millenium Medal by IEEE. In 1999, was Finalist for the Alaska Engineer of The Year Award presented during National Engineer’s Week. In 1998, was awarded the Engineer of The Year for the IEEE Alaska Section. In 2016, was awarded Senior Life Member by IEEE for lifetime contributions to the society, both local and national.

# **RECENT TECHNICAL COURSES**

Power System Protection and Coordination–Quadrelec // Large transformer testing-Peak Measure // Medium voltage cable design–Okonite // Heat tracing in Alaska–Thermon // Batteries for industrial–Exide // Electrical relays–Multilin // EasyPower electrical system analysis–EasyPower // Lighting software-AGI32 Lighting // Wall penetrations–Roxtec.

##### SUMMARY OF EXPERIENCE AND SPECIAL QUALIFICATIONS

* Have excelled at being a Lead Electrical Engineer for many large projects
* Have experience in the field during construction as a Field Engineer
* Have brought business/projects to my present employer for execution
* Have worked away from home for several projects in the US and overseas
* Excellent communicator who has worked closely with clients to meet their unique needs, while maintaining the integrity of the project.
* Excellent team player, working with project management and all engineering disciplines.
* Extremely hardworking, resourceful, seeks innovative solutions to ongoing challenges of projects.
* Worked as an Electrical Engineer on a wide range of industrial, generation, commercial and utility projects.
* Prior to electrical experience, worked as an environmental engineer for a period of seven years and became registered as a civil engineer.
* Management experience includes management of the Electrical and Instrument Department Engineering (Supervisor) for ASRC Parsons Engineering in Anchorage with a peak staff of twenty-eight for the $1.2 billion Alpine project for Conoco-Phillips.
* Excellent materials management skills necessary in successfully procuring and tracking products necessary for completion of a project on budget and on time.
* Electrical/instrument design and project experience includes facility electrical distribution, electrical code upgrade and compliance (both NEC and OSHA), hazardous locations - for both the division and zone systems, full time, peaker, standby and emergency power generation, substations, facility grounding, facility lightning protection, 125 VDC and 24 VDC distribution and supply, UPS, protective relays, interior and exterior lighting, variable frequency drive and soft start motor control, fire detection and suppression systems, gas detection systems, intercom systems, instrumentation including instrument selection and specification, PLC and DCS including wiring and schematic layouts and specification, and pipeline compliance with the CFR.

#### EMPLOYMENT HISTORY

COMPANY: **TAKU ENGINEERING** (5/17 TO PRESENT)

JOB TITLE: SENIOR ELECTRICAL ENGINEER

IGT 3 and Reroutes Chugach Electric

(2018) Alaska

Senior Electrical Engineer and PE for project to minimize arc flash for key buildings and reroute 480V power to buildings in the IGT area of the Chugach Electric power production facility.

WALAKPA MICROTURBINES North Slope Borough (NSB)

(2017-2018) ' Alaska

Senior Electrical Engineer and PE for installation of three (3) new Capstone microturbines at the NSB Barrow Gas Fields site at Walaka, North Slope. Lead senior design engineer in the design of new cable tray, HVAC, 480V switchgear modifications. Interfaced extensively with Capstone.

SOUTH GAS FIELD SITE North Slope Borough (NSB)

(2012-2015) Alaska

Senior Electrical Engineer for EasyPower analysis of the entire site including the aerial distribution. Voltages included 4,160, 480, 277, 240, 208 and 120. Took field trip to gather data on all overcurrent and protection devices. After field trip, built complete one line model in the EasyPower software. Used the model to perform load flow, short circuit and arc flash calculations. Performed coordination study with model TCC curves. Wrote final report with executive summary, narrative of calculations and results, and deficiencies including National Electrical Code (NEC) and NFPA 70E violations.

COMPANY: **NANA WORLEYPARSONS** (Up to 2/2017)

JOB TITLE: PRINCIPAL ELECTRICAL ENGINEER/TECHNICAL AUTHORIY

GMT1 Drillsite ConocoPhillips Alaska

(2015-2017) Alaska

Electrical Lead and PE for entire oil drillsite design that included ten (10) modules (two (2) were the 480V REIM and 13.8 kV Switchgear Module) to be fabricated in Anchorage, and the On-Pad scope including interconnections, cable tray, piperack, electrical schematics and heat trace design for construction on the North Slope. Team included two EE’s and six designers, including checkers. Interfaced with consultant for EasyPower studies, 15kV switchgear and 15MVA transformer.

CD5 Drillsite ConocoPhillips Alaska

(2012-2015) Alaska

Electrical Lead and PE for entire oil drillsite design that included eight (8) modules (two (2) were the 480V REIM and 13.8 kV Switchgear Module) to be fabricated in Anchorage, and the On-Pad scope including interconnections, cable tray, piperack, electrical schematics and heat trace design for construction on the North Slope. Team included three EE’s and nine designers, including checkers. Interfaced with consultant for EasyPower studies, 15kV switchgear and 15MVA transformer.

PS01 Tank 110 & 111 Electrical Upgrades Alyeska Pipeline Service Co.

(2012) Alaska

Did office and field analysis of National Electrical Code violations and designed electrical equipment upgrades for two large oil storage tanks. Work included research of drawings, field work, field tracing and documentation of results in a report. Report included annotated photographs.

Nikaitchuq Project (Seconded) ENI Petroleum

(2009-2011) Alaska

Served as the owner company Technical Authority (TA) for the Electrical, Instrument and Fire & Gas disciplines for this project that includes the onshore, offshore and camp area facilities.

Z Pad Expansion Drillsite BP

(2007-2009) Alaska

Designed entire electrical system for the installation of an ECM Module, FM Module, SDV Module, Test Separator Module, Chemical Injection Module and Interconnections for project on the North Slope of Alaska.

OT/OTL 2007 & 2008 BP

(2006-2007) Alaska

Designed electrical for installation of ECM Modules on the North Slope of Alaska. Work was part of extensive upgrade by BP to facilitate the pigging of oil production lines.

I Pad Drillsite BP

(2006-2007) Alaska

Designed electrical at Conception Stage for installation of an ECM Module, SDV Module, Test Separator Module, Production Modules, and other for a drillsite on the North Slope of Alaska.

COMPANY: **BERGAILA AND ASSOCIATES AT NANA/COLT ENGINEERING** (2005-2006)

JOB TITLE: SENIOR ELECTRICAL ENGINEER

Kenai LNG Plant ConocoPhillips Alaska

(2005-2006) Alaska

Designed electrical for replacement of GE turbine driver with Solar for natural gas compressors.

Kuparuk ULSD Upgrade ConocoPhillips Alaska

(2005) Alaska

Designed electrical for new ULSD diesel fueling station.

COMPANY: **ANVIL CORPORATION** (2004 TO 2005)

JOB TITLE: SENIOR ELECTRICAL ENGINEER

Kenai Refinery Tesoro

(2005) Alaska

Worked at the refinery to help the I&E department with senior electrical engineering support. Projects included heat trace, addition of PLC and timing controls for air sparging for groundwater remediation, miscellaneous small projects for the hydrocracker, crude and tank farm units.

Cherry Point Refinery BP

(2004-2005) Washington

Helped complete the design for a replacement medium-voltage substation, did cost estimate on the addition of a new boiler, and designed changes/modifications to the control room and control building.

COMPANY: **POWER ENGINEERS** (2001 TO 2004)

JOB TITLE: SENIOR ELECTRICAL ENGINEER

Buzurgan, Iraq, Power Plant Perini

(2003-2004) Iraq

Under Task Force RIE, Corps of Engineers, served as site field engineer for a period of 7 months in Iraq to install a 45 MW GE LM6000 power plant in SE Iraq. Answered questions and solved design and construction problems for structural, electrical, instrument and substation. Also provided on site expertise required in the procurement of materials for the project. Participated in the design for the month of November, 2003, in the Atlanta office of POWER Engineers.

Afghanistan Diesel Power Plant Perini

(2003) Kabul, Afghanistan

Was field electrical engineer in Afghanistan for a 6 MW diesel power plant for a army base near Kabul. Perini was the contractor to the Corps of Engineers. Provided site field engineer with onsite questions and problems, was part of testing, commissioning and running the plant for a short time.

Stony Brook Energy Center Calpine

(2003) Boise, Idaho

Lead electrical engineer (team of 4) for nominal 80 MW combined cycle generation plant, with LM6000 gas turbine and steam turbine generator (1x1x1 configuration) installed in Stony Brook, New York. Work included all balance of plant electrical work including 3-winding GSU, aux. transformers, relay protection, PDC building built by Powell in Houston, distribution at 13.8 kV, 4.16 kV, 480V, 125 and 24 VDC, lightning protection, grounding grid per IEEE 80, medium voltage and 480V bus duct, and cable tray routing.

Wolfskill Peaker Project Calpine

(2002) Boise, Idaho

Lead electrical engineer (team of 4) for nominal 45 MW GE LM6000 gas turbine generator project installed in Fairfield, California. Work included all balance of plant electrical work including GSU, aux. transformers, relay protection, PDC building built by Powell in Houston, distribution at 13.8 kV, 4.16 kV, 480V, 125 and 24 VDC, lightning protection, grounding grid per IEEE 80, medium voltage and 480V bus duct, cable tray routing, and both office and field construction/startup help. Work also included coordination with California CBO.

Riverview Peaker Project Calpine

(2002) Boise, Idaho

Lead electrical engineer (team of 4) for nominal 45 MW GE LM6000 gas turbine generator project installed in Antioch, California. Work included all balance of plant electrical work including GSU, aux. transformers, relay protection, PDC building built by Powell in Houston, distribution at 13.8 kV, 4.16 kV, 480V, 125 and 24 VDC, lightning protection, grounding grid per IEEE 80, medium voltage and 480V bus duct, cable tray routing, and both office and field construction/startup help.

Bethpage Peaker Project Calpine (2001) Boise, Idaho

Lead electrical engineer (team of 4) for nominal 45 MW GE LM6000 gas turbine generator project installed in Bethpage, New York. Work included all balance of plant electrical work including GSU, aux. transformers, relay protection, PDC building built by Powell in Houston, distribution at 13.8 kV, 4.16 kV, 480V, 125 and 24 VDC, lightning protection, grounding grid per IEEE 80, medium voltage and 480V bus duct, cable tray routing, and both office and field construction/startup help.

COMPANY: **ASRC PARSONS ENGINEERING, LLC** (1997 TO 2001)

JOB TITLE: E & I ENGINEERING SUPERVISOR

Alpine Development Project ARCO (1997-2001) Anchorage, Alaska

Supervisor of Electrical and Instrument Department for design of $1.2 billion project to develop production facilities for new field on the North Slope of Alaska. Facilities included drillsites, infrastructure, central facility and modules for connection to an existing production field. Peak staff was twenty-eight E & I engineers and designers. Responsibilities included hiring of all E & I staff, development and maintenance of budgets and schedules, PE stamping of all department drawings, interfacing with onsite ARCO staff, construction, QA/QC and functional checkout groups, and complete materials requisitions using Parson’s computer-based procurement system. Additionally, was responsible for direct oversight of module design and fabrication by Powell in Houston, and fire and gas detection systems by Dooley-Tackaberry in Houston. Position required simultaneous direct design and supervision of department.

COMPANY: **FLUOR DANIEL ALASKA, INC.** (1989 TO 1997)

JOB TITLE: SENIOR ELECTRICAL/INSTRUMENT ENGINEER

Electrical Systems Survey Unocal

(1996) Anchorage, Alaska

Provided electrical survey of five oil platforms in the Cook Inlet and the Granite Point Tank Farm. Purpose was to evaluate adequacy of existing systems, document operational problems, and make recommendations for improvements. Included was a short circuit analysis of the Baker Platform.

Tariff Case Alyeska Pipeline Service Company

 (1996) Anchorage, Alaska

Provided technical support and interface with attorneys for Alyeska Pipeline in tariff case with the State of Alaska involving maintenance work performed by Alyeska Pipeline as part of ANSC electrical code upgrade project.

Audit Compliance Tracking (ACT) Project Alyeska Pipeline Service Company

(1995) Anchorage, Alaska

“Champion” of Electrical and Instrument work groups for Alyeska owner and BLM audit items. Prepared, and directed preparation by others, the Corrective Action Plans (CAPS) and Closure Packages for closure of audit items. Packages had to meet approval of Quality Assurance Department and the Joint Pipeline Office (JPO).

ANSC Project Alyeska Pipeline Service Company

(1994) Fairbanks, Alaska

Lead electrical engineer for $250 million project to bring Alyeska's pipeline facilities up to the latest OSHA electrical codes. Was direct supervisor for ten engineers, and was technical lead for six field engineers involved with the inspection phase. Project included inspection, design, construction and final inspection. Design phase met the project schedule goal. Project required interface with other consultants, Quality Assurance, Quality Control and the Joint Pipeline Office (JPO).

Client In-House Projects Alyeska Pipeline Service Company

(1992-93) Anchorage, Alaska

Electrical engineer at Alyeska for lead effort in design and technical direction during construction. Projects included upgrades to fire systems, correction of violations to the National Electrical Code, a new incinerator building at PS3, complete electrical distribution upgrade of the Nordale storage facility, replacement of the pump station battery and UPS systems, and modifications to Alyeska's runways. Supervised design consultant and review consultant for the fire project. Approximate cost of projects was $5 million.

Client In-House Projects Marathon Oil Company

(1991) Anchorage, Alaska

Electrical engineer at Marathon Oil. Designed replacement 250 KW generator for Beaver Creek facility; provided field testing (included BMI power analyzer, oscilloscope, temperature probe, low-range ohmmeter and VOM) and final report for corrections to the 1 MW electric therminol heater on the Steelhead Platform in Cook Inlet; did cost estimate to automate the facilities at Trading Bay; supervised design consultant in miscellaneous power, control and fire system projects for the Dolly Varden Platform.

L and H Pad Test/Separator Modules Conoco Oil Company

(1990-1991) Anchorage, Alaska

Performed instrumentation design for truckable modules destined for Milne Point, Alaska. Duties included sizing and specifying control valves, relief valves and actuators, designing the heating and ventilation controls, pressure, temperature, level sensors and transmitters, and designing the Halon protection and gas detection systems. Performed electrical design of modules as lead engineer.

MR-48 Maintenance and Repair Manual Alyeska Pipeline Service Company

(1990) Anchorage, Alaska

Principal coordinator for the rewrite of MR-48, the operation and maintenance manual for the 48-inch TAPS oil pipeline. Coordinated the efforts of approximately 30 Alyeska engineers and managers.

Shipping Pump Addition Marathon Oil Company

(1989) Anchorage, Alaska

Electrical engineer for the addition of three 500-HP AC induction motors and drives to the Dolly Varden Platform. Drives were variable frequency (VFD), and components were specified to reduce total harmonic distortion. Design also included a Halon protection and explosion suppression system, combustible gas detection system, new lighting and power distribution, and new 4,000-Ampere switchgear and bus duct.

COMPANY: **FRANK MOOLIN & ASSOCIATES** (1981 TO 1988**)**

JOB TITLE: PROJECT ELECTRICAL/TELEMETRY ENGINEER

Carlson Center Fairbanks North Star Borough

(1987-1988) Fairbanks, Alaska

Electrical engineer of design/build team. Facility was 114,000 square-foot city sports arena that included an olympic-size hockey rink/basketball court/stage, conference room, and all-electric kitchen. Design included 2,500-Amp main switchgear, 150-KVA emergency generator, lighting including interior arena sports floodlights, parking lot lighting, power distribution, fire detection, wiring for audio system, interface to building automation system and primary feed from outside the property.

Ft. Greely Composite Building Corps of Engineers

(1986-1987) Anchorage, Alaska

Electrical engineer for 35,000 square-foot cold weather test and research facility. Design included lighting, power distribution, fire detection, and security systems.

Administration Building North Slope Borough

(1987) Barrow, Alaska

Participated in field work and developed complete electrical as-built drawings after for 25,000 square-foot building. Wrote Project Analysis Report that addressed recommendations for repairs, listed all code violations, and contained a construction cost estimate.

Mud Plant, Endicott Island SOHIO

(1986) Anchorage, Alaska

Participated in electrical design for design/build team. Performed final inspection for construction.

Barrow Utilidor and Utility System North Slope Borough

(1981-1985) Barrow, Alaska

Lead electrical engineer for design, inspection, and testing of 30,000 feet of buried utilidor, four sewage pumping stations, a main water recirculation and distribution building, and a telemetry system. Design work included lighting, power distribution, relay controls for boiler, water and air heating systems, controls for 75-HP DC drives in each of the pump stations, gas and fire detection, air purge system, fire, security and communication systems. Telemetry system contained approximately 2,000 points.

COMPANY: **U.S. PUBLIC HEALTH SERVICE** (1978 TO 1981)

JOB TITLE: DESIGN ENGINEER

Mission of federal office was to provide water and sewerage facilities for the approximately 220 native communities of Alaska. Position responsibilities included design of water and wastewater treatment equipment, pumps, piping, building structural, mechanical and electrical systems, feasibility studies, and meeting with community native councils to plan scope of work and resolve issues.